

# COMPUTERWORLD

## Notebook price cuts ignite user interest

BY MICHAEL FITZGERALD  
CW STAFF

CHICAGO — Vicious competition is driving down prices of 80386SX-class notebooks — and fast. Street prices could hit \$1,500 for an entry-level 386SX-based system as soon as this spring, with some systems likely to fall below \$1,000 by year's end.

Users eagerly await the thud. "This is absolutely the kind of thing that will accelerate our move to notebooks," said Shel-

don Laube, Price Waterhouse's national director of information technology.

The firm plans to buy notebooks at a 3-to-1 ratio over desktop personal computers by year's end.

"We have a few notebooks, but we think the pricing is not cost-effective right now, so that price

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## Sun sets out to rise again

*Expects to leapfrog competitors with deluge of workstations, servers*

BY MARYFRAN JOHNSON  
CW STAFF

SANTA CLARA, Calif. — Sun Microsystems, Inc. is ready to regain lost ground in the high-performance workstation wars. It is gearing up to introduce a slew of new products, ranging from a \$5,000 color workstation to a powerful multiprocessor system capable of growing to 20 processors, according to users and analysts gathered here last week at Sun World Expo '92.

Sun's initiatives are key because the Mountain View, Calif., company's products have been outshone in performance measurements by workstations and servers recently unveiled by Hewlett-Packard Co. and IBM.

"Sun is going to be showing some very interesting price/performance gains with product [introductions] starting sometime in the next 90 days," said David Wu, an industry analyst at S. G. Warburg & Sons, Inc. in New York.

"Over the next 12 months, Sun will dispel all the doubts about it," Wu added.

One customer who was briefed by Sun on its multiprocessor plans said a 20-processor system, which is expected to be available sometime next year, could act as a corporate server for as many as 100 local-area networks. A four-processor desktop system is slated to show up in early 1993, analysts said, adding that the first members of the next-generation SPARCstation 3 workstation line should be shipping by the fall.

### DATA CENTER MAINTENANCE

## There's no time for downtime

BY JEAN S. BOZMAN  
CW STAFF

The world never stops turning, and in today's global electronic village, it is also true that the lights never go out. That is why international corporations with huge data centers that serve the world are finding it so hard to schedule system software upgrades and repairs for mainframe hardware.

The automation of data centers — designed with lights-out operations in mind — is progressing far better than the installation of periodic software updates, industry analysts said. That is because the advent of robotic tape libraries and disk-array subsystems has made lights-out automation possible.

However, the task of upgrading systems software remains cumbersome because most upgrade procedures require the mainframe to come to a full stop.

"Many IS shops expect to run around the clock with 100% availability," said Arnold Farber,



Sabre's Smyth takes systems down one at a time

president of Farber/LaChance, Inc., a Richmond, Va., data center operations consultancy. "In the future, they will need to perform maintenance on these systems while they're up and running."

Some software products already allow upgrades without full-stop initial program loads, but the ability to install changes on the fly remains the exception rather than the rule.

As a result, today's "window" of maintenance,

*Continued on page 14*

### Free fall

386SX notebook list prices have declined 119% since late 1990

Average list price    Average street price



\*The Compaq 386S/20 was the first product in the market

Source: International Data Corp.

## IRS seeks to cash in on third IS overhaul

BY GARY H. ANTHERS  
CW STAFF

WASHINGTON, D.C. — It is possible this week to close one's eyes and imagine the Internal Revenue Service's aging computer systems wheezing and

groaning as millions of 1040 forms flood in from last-minute filers.

Although computer processing is going smoothly so far this year, IRS officials are the first to acknowledge that the agency's 30-year-old systems are in an ad-

vanced state of digital decrepitude. That's why the agency is revamping them.

"Our systems are so antiquated that we cannot adequately serve the public," Shirley D. Peterson, the IRS' new commissioner of internal revenue, said at a recent congressional hearing. "The potential for breakdown during the filing season greatly exceeds acceptable business risk."

It is not just the software — mostly written in assembler language — that has become grizzled over the decades. "Some

*Continued on page 12*

### A taxing situation

*Estimated costs and benefits of the IRS tax modernization plan*

Incremental cost of new systems (in billions) **\$7.6**

#### Benefits to government

- Cost savings through productivity gains **\$8.6**
- Increased revenue and interest savings **\$3.1**
- Total benefits to government **\$11.7**

#### Benefits to public

- Tax return preparation savings **\$5.9**
- Reduces time dealing with IRS personnel by 1 billion hours.

Source: Internal Revenue Service

### Colorful future

In the conference keynote, Sun President and Chief Executive Officer Scott McNealy confirmed the upcoming debut of a "usable, fully capable" \$5,000 color workstation, referring to Sun's intention to configure base systems with ample disk and memory to run applications.

McNealy pledged to continue lowering hardware prices and said his company would offer the industry's best server for less than \$200,000.

He also sketched out some details on future multimedia offerings, including 16-bit audio capabilities and Integrated Services Digital Network support built into system motherboards.

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**Desktop Unix** to get boost from Unix System Laboratories. Page 4.

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## Quotable

**"We've done Windows apps, but we didn't inhale."**

PHILIPPE KAHN  
BORLAND

*Best Comdex/Spring '92 quip.  
See story page 17.*

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# EXECUTIVE BRIEFING

■ **The Internal Revenue Service** is well into its third attempt to overhaul its aging computer systems. Processing is going well, but observers say the mammoth modernization effort is full of difficulties. Nevertheless, the payoff for 125 million users — taxpayers — should be significant. **Page 1.**

■ **Insidious "soft" factors** such as poor management and political skills can wreak havoc on a software project as surely as technology or planning gaffes can. Case studies of bungled software efforts at a global engineering firm, a cargo company and a Big Six accounting house reveal that such problems account for millions of dollars in cost overruns — and extend schedules by years. **Page 83.**

■ **Cutthroat competition** is expected to drive prices on entry-level 386SX-based notebooks from brand-name vendors — Toshiba, for instance — below \$1,500 by midyear. Price wars and manufacturing efficiencies, coupled with a hoped-for rise in product turnover, could bring prices below \$1,000 by year's end. **Page 1.**

■ **IS professionals in the U.S. could learn something from Japan**, according to a new Ernst & Young study. Among Japan's strengths: a heavier focus on people than on technology, selective automation, frequent job rotation and higher accountability for producing business results. **Page 87.**

■ **Major technological and legal barriers** await U.S. firms seeking to build or expand networks in the unifying Europe. Chief among them are unreliable and inconsistent telecommunications services, conflicting standards, monopolistic carriers and a host of bewildering alliances. **Page 77.**

■ **The sun never sets on today's global village** — which means that the huge IS shops serving worldwide firms are scrambling to find a way to schedule system software upgrades and mainframe repairs. **Page 1.**

■ **DEC posts a disastrous third quarter**, prompting company officials to announce layoffs beginning on May 1. **Page 4.**

■ **X Window System development hits the fast track** as users find it an increasingly cost-effective way to distribute windowed computing across an organization.

**Page 65.**

■ **The pen computing picture** should get a bit clearer this week with the debut of Go's PenPoint operating system. The good news: PenPoint is designed for pen computing from the ground up. The bad news: It's incompatible with MS-DOS. **Page 29.**

■ **A fully capable \$5,000 color workstation** is only one of a barrage of products about to hit the shelf from Sun Microsystems, as the firm bids to recapture some high-end workstation ground. **Page 1.**

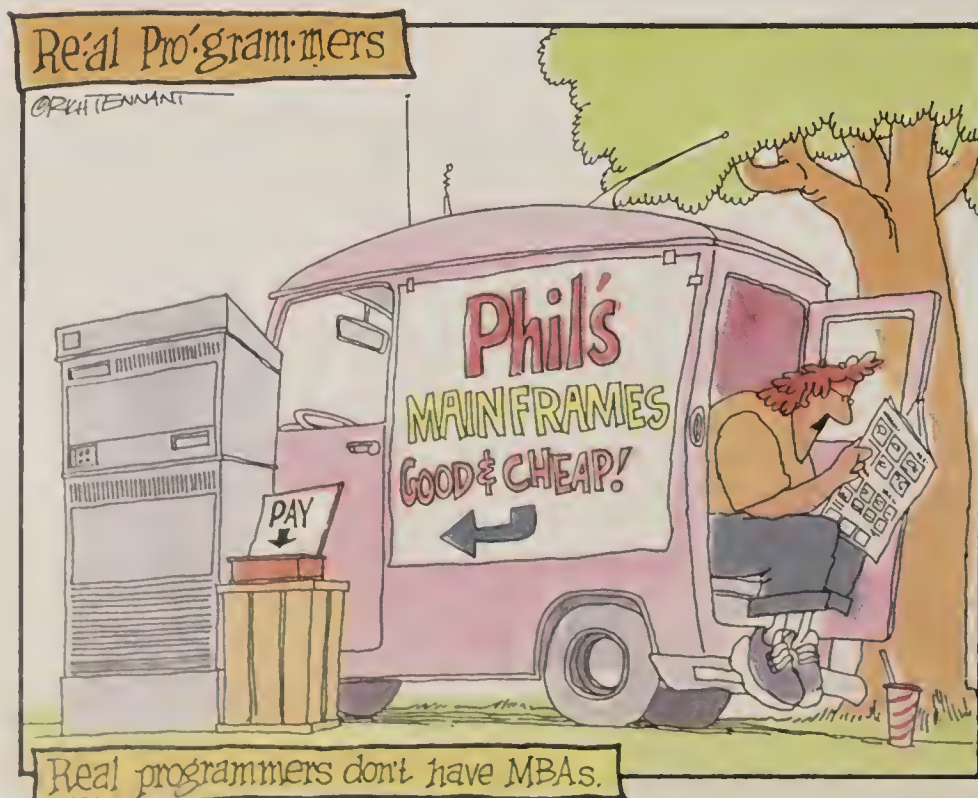
■ **Knowledge engineering** may be a career to consider if you've ever fantasized about being a psychologist, philosopher, anthropologist or journalist. **Page 91.**

■ **IBM calls it "rightsizing,"** but it's really a way to use the AS/400 as a downsizing lure to keep low-end mainframe customers in the IBM fold. **Page 69.**

■ **Macs are catching the corporate eye** as recent operating system and network enhancements improve the Mac's link to corporate hosts. However, Apple's file server still isn't ready for prime time. **Page 55.**

■ **On site this week:** An Avion server, bulletin board and E-mail system make tax time less frantic for a tax preparation software maker. **Page 58.** Customer service drives an ice cream maker's migration to a yummy combination of a minicomputer and a suite of software. **Page 70.** Baseball stats agency uses VAX-laptop combo to bring you box scores at breakfast. **Page 71.**

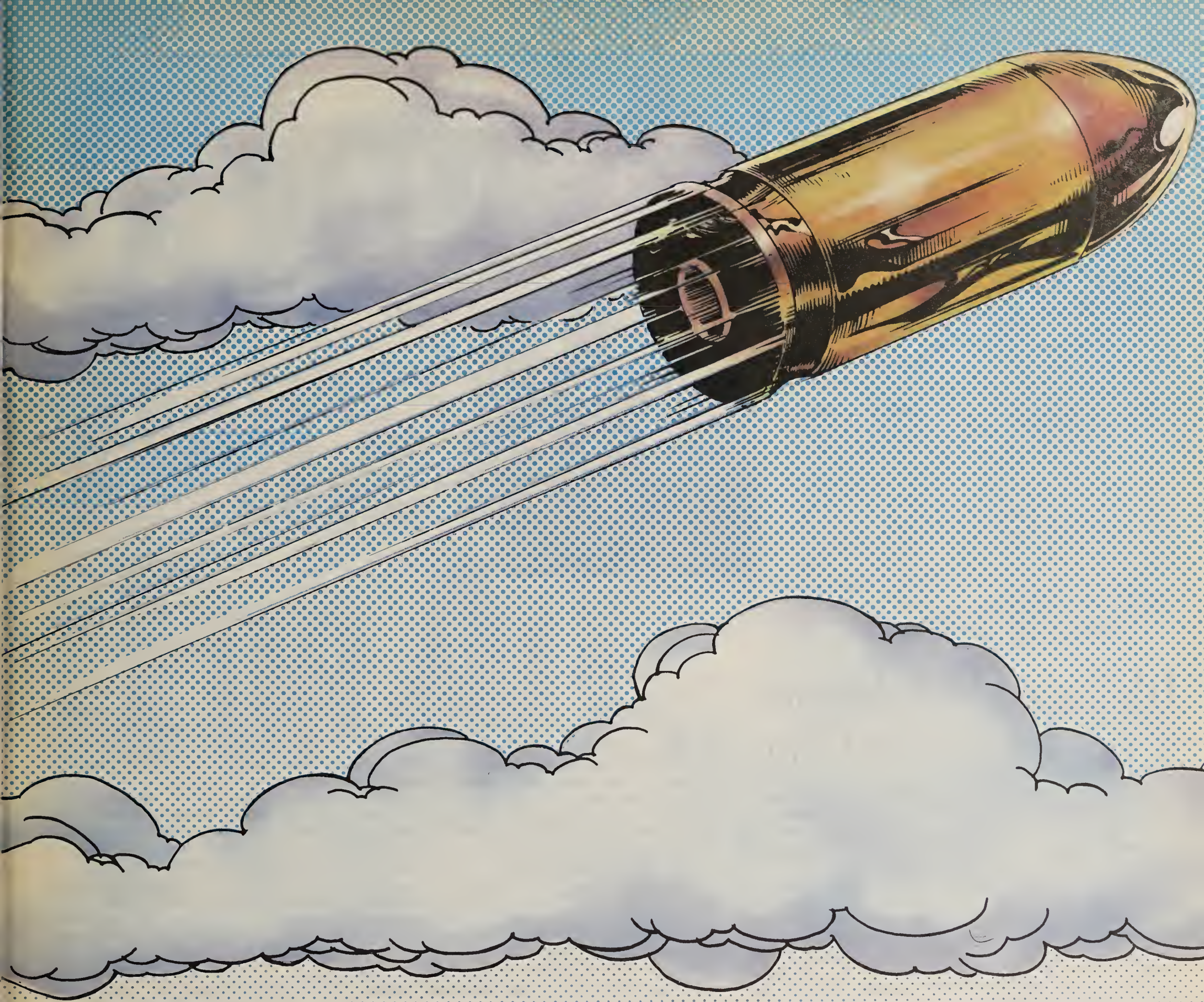
## The 5th Wave



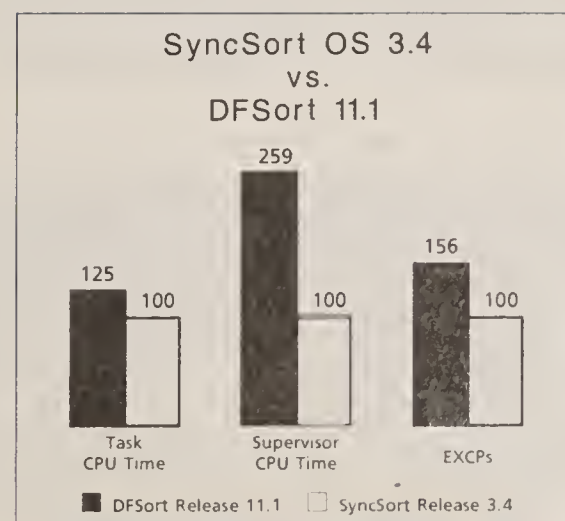
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# Sluggish sales cost DEC \$294M in quarter

BY SALLY CUSACK  
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp.'s disastrous third-quarter earnings last week revealed that customers are neither buying VAX/VMS nor purchasing enough workstations, personal computers and services to make up the difference.

The company announced a \$294.1 million net loss for its third fiscal quarter ended March 28. Layoffs will resume at DEC as of May 1 to help bring revenue in line with costs, according to DEC Senior Vice President Jack Smith. Smith, who oversees DEC's operations, attributed the company's staggering loss to the poor worldwide economy and lower than anticipated sales volume.

Notably, sales in DEC's traditional product line — the VAX

Series 4000 and 6000 and the relatively new 9000 — were down in the third quarter, Smith said, declining to quantify them.

Overall, DEC's product sales were \$1.75 billion in the quarter, a decrease of \$350 million from the corresponding quarter last year. Total revenue was \$3.2 billion, down 9% from last year's comparable quarter.

While DEC said it is experiencing growth in PCs, workstations and systems integration, the lower margins of those products and services could not offset losses incurred in its VAX line.

"I can see why [customers] are not buying the VMS high end because of pending Alpha announcements, but why isn't the

lower end VAX 4000 VMS moving?" asked David Wu, a computer financial analyst at S. G. Warburg & Co. in New York.



DEC's Smith attributed the staggering loss to the weak worldwide economy and poor VAX sales

Several DEC customers said they felt uncomfortable discussing the vendor's financial problems, but one heavily invested DEC user said the losses did not worry him.

"We expected DEC to be under pressure for several quarters, but they will turn it around," said David J. Foss, a section leader at Glidden Paint Research Center's computer science department in Strongsville, Ohio.

Wall Street anticipated a loss, but no one was quite prepared for one of this magnitude, according to Robert G. Herwick, an analyst at Hambrecht & Quist, Inc. in San Francisco. DEC's stock dropped almost 15% as of midday Friday, falling to \$45 per share.

# Anchor Bank outsources IS

BY NELL MARGOLIS  
CW STAFF

HEWLETT, N.Y. — Anchor Savings Bank FSB, whose estimated \$8 billion in assets and \$6.6 billion in deposits make it one of the nation's 25 largest thrifts, last week outsourced its IS functions to Systematics Information Services, Inc. for an undisclosed sum.

Significant bottom-line savings for the bank and the conversion of information systems costs into "predictable and defined expenses year after year" drove the deal, according to a statement issued by Anchor Chairman and Chief Executive Officer James M. Large Jr.

The opportunity to leverage Systematics' banking-intensive technology also loomed large, said Joel Talka, executive vice president.

The outsourcing firm, he said, was chosen to be Anchor's full-fledged partner in its current effort to forge itself into a technology-enabled bastion of customer service.

Under the agreement, Anchor's approximately 98 IS employees became full-fledged Systematics employees, effective April 1. They will continue to work at the bank's data processing center in Wayne, N.J.

Little Rock, Ark.-based Systematics edged out computer services giant Computer Sciences Corp. to win the six-year Anchor deal; IBM subsidiary Integrated Systems Solutions Corp. and Electronic Data Systems Corp. were eliminated in earlier bidding. Systematics' "long track record" as an outsourcer specifically to the banking industry weighed in its favor, Anchor President and Chief Operating Officer Richard Dalrymple said.

The Anchor/Systematics deal may augur a pickup in what has so far been a 1992 lull in bank outsourcing — something of a boomtown until the past several months, noted Arthur Gillis, president of New Orleans-based banking consultancy Computer Based Solutions, Inc. Seven bank outsourcing deals closed in this year's first quarter, according to Gillis — in stark contrast with 15 such deals sealed in the first three months of 1991 and 11 in the corresponding 1990 period.

However, Gillis said, "lull" is likely to be the operative word. A rapidly polarizing banking market, he said, is stranding some 700 midsize banks (\$500 million to \$5 billion in assets) with dwindling customer bases and application alternatives. Many such banks will seek relief in outsourcing, he speculated.

# DEC to add 23 elements to Polycenter platform

BY ELISABETH HORWITT  
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. plans to throw 23 enhanced and new offerings into the large, amorphous enterprise management kettle that it calls Polycenter.

The offerings promise extended systems and network management via Polycenter's core network management system, DEC Management Control Center (MCC) Director, according to a DEC press release obtained by *Computerworld*.

One key introduction is an Ultrix version of DECmcc Director, a source close to DEC said. DEC will also commit to migrating DECmcc to Unix Version V Release 4 and Open Software Foundation/1 platforms at an undisclosed date, according to Paul Callahan, a senior analyst at Forrester Research, Inc. in Cambridge, Mass.

DEC is also expected to release a program announcement of a distributed, Ultrix-based DECmcc platform to manage both DEC and non-DEC Unix-based systems. Performance management, file management and user account management modules will track systems statistics, CPU use, print queues and memory, Callahan said.

Another key introduction will be DECinspect Version 2.2, which will extend the package's network security features to Sun Microsystems, Inc.'s SunOS and Ultrix systems, the release said. In a related announcement, DECinspect Intrusion Detector

for VMS Version 1.0, is said to detect, track and invoke countermeasures against suspicious and hostile activities on a real-time basis.

In addition, DEC is expected to announce DECmcc support for two additional network vendors, Technically Elite Concepts, Inc. and Applitek Corp., and expanded product support from longtime Polycenter part-

ner Computer Associates International, Inc.

An expected Data Collector announcement will support bidirectional information exchange between DECmcc and third-party management applications, Callahan said.

"DEC has got to start providing truly interactive modules [for DECmcc]," said Frank Dzubeck, president of Communications Network Architects, Inc. in Washington, D.C.

DEC is also expected to enhance DECmcc Director's ability to manage multivendor devices via Simple Network Management Protocol. This interests

Group Health, Inc., which is evaluating DEC's platform and others, said Brad Hanson, technical support manager at Group Health.

Polycenter is the DEC equivalent of IBM's SystemView, an umbrella term for everything that helps manage a multivendor enterprise through IBM's Net-View.

"Polycenter does not apply to us right now," Hanson said. However, the idea of a standardized, centralized way of "managing the databases and applications themselves" is definitely "one area that we are trying to figure out," he added.

# USL previews Unix environment for PCs

BY ELLIS BOOKER  
CW STAFF

CHICAGO — In a series of small briefings here last week, Unix System Laboratories, Inc. (USL) demonstrated a prerelease copy of Destiny, its answer to users wishing to run Unix on desktop personal computers.

The sneak previews, attended largely by independent software developers, were almost lost amid the noisy battle being waged by IBM and Microsoft Corp. for the future of the desktop with OS/2 2.0 and Windows New Technology (NT), respectively, at nearby Comdex/Spring '92.

Destiny, which runs Unix 5.4 Enhanced Security as well as DOS applications, hides Unix's command-line structure behind either a Motif or Open Look graphical user interface.

The environment will be released sometime in the second quarter, according to Paul Calkin, USL's marketing manager.

A developer's kit and application programming interface definitions for Destiny are already available to independent software developers from Univel, the USL/Novell, Inc. joint venture, he added.

"We have [with Destiny] a standard model, as opposed to a standard Unix that has been extended by one company," Calkin said, referring to The Santa Cruz Operation's (SCO) already available Open Desktop product. Destiny is binary-compatible with SCO's Unix implementation and will run SCO applications without modification.

"It's not shipping, and my take on [Destiny] is it's optimistic [USL] will have a product out by the end of this year," said Douglas L. Michels, SCO's executive vice president.

Users who choose to run Unix on the desktop will have no less than three alternatives. In addition to USL and SCO, Solaris 2.0, the Unix V Release 4 version of Sun Microsystems, Inc.'s

operating system for both Sun's Scalable Processor Architecture and Intel Corp.'s chip sets, is due out by September. "It'll be an interesting competition among the three," said Michael Goulde, a senior consultant and editor in chief of "Unix in the Office" at Patricia Seybold's Office Computing Group in Boston.

For many of the approximately 70 million DOS-based PCs in existence that require a more substantial operating system to run advanced applications, such as multimedia, the choice will come down to either Windows NT or Unix, Goulde said, adding that the Unix desktop able to attract the most applications will be the victor on the Unix side of the fence.

Destiny's minimum requirements are an Intel 80386/SX-class computer running at 16 MHz, with 4M bytes of random-access memory, a 60M-byte hard drive and an IBM Color Graphics Adapter or better graphics drive.



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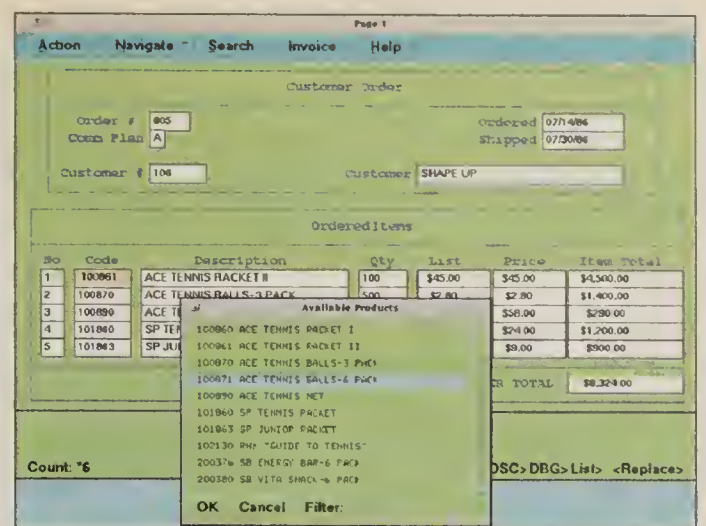
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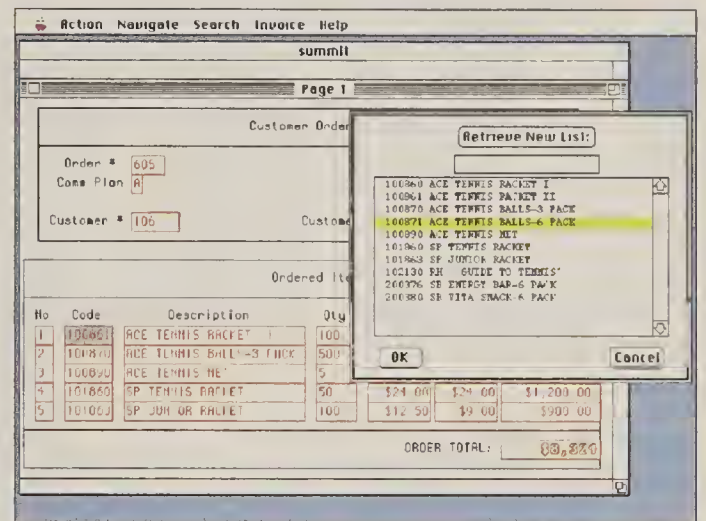
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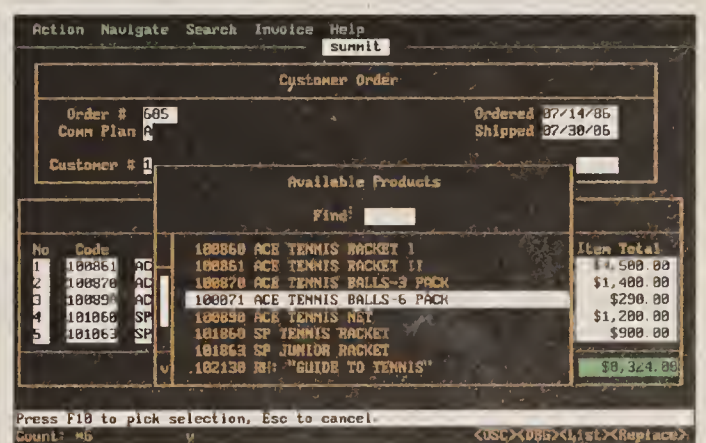
Open Look



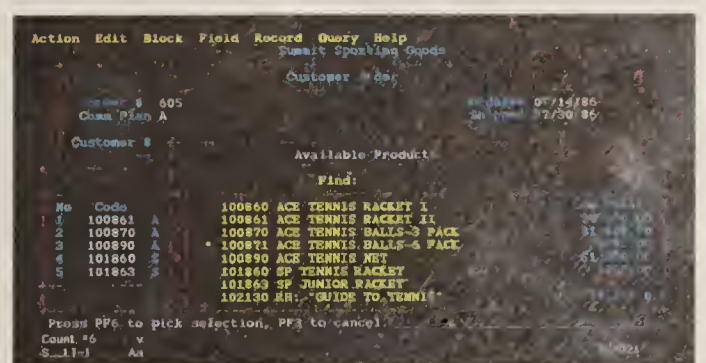
Macintosh



Motif



Character Mode



Block Mode



## NEWS SHORTS

### Can't say they didn't tell you

After warning last month of an impending quarterly loss and sales drop, Pyramid Technology Corp. said last week that it expects a bigger revenue shortfall than previously predicted. Several big deals did not hit the books in time for the San Jose, Calif.-based firm's March 27 fiscal second-quarter cutoff, Pyramid said. Final results are due out next week.

### Intel Q1 profits decline

Intel Corp. posted increased revenue and a drop in profits for its fiscal 1992 first quarter ended March 28. Intel recorded \$184 million in profits on \$1.24 billion in sales. Last year, Intel earned \$197 million on \$1.13 billion in sales. Intel blamed the drop in profits on a onetime charge of \$35 million used to settle a patent infringement suit with Hughes Aircraft Co.

### AS/400 storage battle escalates

Following its recent announcement of the 7637 disk array, IPL Systems, Inc. has released the 7936 Model 40. Listing at \$54,200, the product offers a 5¼-in. format with 2.4G bytes of Small Computer Systems Interface-2 disk drives and provides up to 6.8G bytes of storage. EMC Corp., another strong player in the midrange storage arena, unveiled its Harmonix Series of Integrated Cache Disk Array products for the Application System/400.

### Another storage tiff goes to court

Unisys Corp. filed a patent infringement lawsuit last week against peripherals maker Amperif Corp. in Chatsworth, Calif. The suit requests unspecified monetary damages and that Amperif be barred from selling some of its Unisys 1100/2200-compatible disk storage systems. An Amperif press release called the suit "without merit" and claimed the legal action is "based on nearly 10-year-old patents."

### No venture capital shortage here

New York-based venture capital firm Nazem and Co. has agreed to invest \$1 million each in start-ups, Penware, Inc. and KNEX. San Jose, Calif.-based Penware has already shipped its Pencil spreadsheet for both the Momenta Corp. pen-based personal computer and Microsoft Corp.'s Windows for Pen Computing platforms. KNEX is working on communications technology designed to speed the acceptance of both teleconferencing and telecommuting.

### Look, no wires!

Ericsson GE in Paramus, N.J., demonstrated its Mobidem portable wireless model with Microsoft's Windows for Pen Computing platform at last week's Windows World in Chicago. It allows pen-based, palmtop, notebook and laptop computers to send and receive messages via the Mobitex mobile data network, which uses packet-switched wireless technology.

### Short takes

Sears, Roebuck and Co. will sell Apple Computer, Inc. products including the Macintosh Classic II, LCII and IISI PCs as well as the Powerbook 140 portable, all bundled with Claris Corp.'s Clarisworks. An Apple modem and Apple's Stylewriter printers will also be available. . . . Novell, Inc. bought International Business Software Ltd., a maker of Macintosh server software, for \$5.2 million. . . . Monroe, Mich.-based Hilgraeve, Inc. has acquired KopyKat, OS/2-based remote-control software technology from San Francisco-based Canyon Co. . . . Network Management, Inc. has formed a division to custom-design software for clients moving from mainframes to distributed networks. Division President James H. Knowles joins the firm from Salomon Brothers, Inc. . . . Wang Laboratories, Inc. granted a single in-line memory module license to Oki Electric Industry Co. . . . After 40 years with IBM, Commercial and Industry Relations Vice President Howard Figueroa will retire as of April 30, passing the baton to Marshall C. Phelps Jr. Douglas C. Worth succeeds Phelps as director of governmental programs.

## Bull lifts veil on IBM alliance

*Firm smooths ruffled feathers of neglected users with product previews*

BY KIM S. NASH  
CW STAFF

LOUISVILLE, Ky. — Groupe Bull warmed approximately 400 customers last week by pre-announcing products that have sprouted from the French firm's January pact with IBM.

The company also vowed to rewoo 3,000 U.S. customers who have gotten lost in the shuffle during the last several years, said Ward MacKenzie, executive vice president of operations at Bull HN Information Systems, Inc. He said that during Bull's reorganization in January, he found that some users had not been contacted for five to six years.

"We've been shocked by how little we knew about this base of customers," MacKenzie confessed.

Official statements are planned for Wednesday, but at a Bull User Society meeting held here, Bull clued attendees in on the following proprietary and IBM-related products:

- The DPX/20 line — relabeled IBM RISC System/6000 workstations that Bull will start reselling next month.
- The DPS 7000/400 and 700 Series — low-end mainframe-class systems planned for release later this year.
- The DPS 9000/500 Series — midlevel big iron running GCOS

8 and due to ship within weeks.

- The Z-Note 325LC — a 5.9-pound, active-matrix color portable from Zenith Data Systems, a Bull subsidiary.

### Full steam ahead

These products come amid Bull's transition from minicomputer maker to open systems integrator. Key to the service scheme is the Distributed Computing Model (DCM), which is a framework built on standards sanctioned by the Open Software Foundation (OSF) for getting disparate products to talk to one another.

The minicomputer maker wants to increase service revenue in each of five business units, which are delineated by type of user, such as major accounts, general accounts and telecommunications firms. Right now, service sales are less than 3% of total revenue for four of the five groups, MacKenzie said.

Bull plans to add OSF's Distributed Computing Environment (DCE) features to its existing Mips Computer Systems, Inc.-based Unix workstations, called DPX/2s, and to the DPX/20 line by September, said Jean Laurent, a marketing officer at Bull HN. DCE is a set of DCM specifications for building and running distributed applications.

Components of DCE will also be added to the GCOS operating systems, he added, but gave no time frame.

Bull officials — from Axel LeBlois, president and chief executive officer at Bull HN, on down — repeated the party line: DCM protects Bull users' proprietary systems while expanding the number of available applications and marking an open systems migration path.

But most users interviewed last week said they want to stay put. Jack Lawton, MIS manager at Carnation Dairy — a 17-year Bull shop — was typical. He said the midlevel Bull DPS 7000 installed at the Phoenix-based division of Nestle, Inc. "is a good piece of equipment. I don't see any drastic changes [in our shop] for the next two to three years."

Others who plan systems changes are moving slowly. The Alabama Rehabilitation Department of Crippled Children's Services, which now runs two DPS 6000s, is already two years into a five-year plan to mix Unix and Bull systems. But the group will just start a full-blown test of Unix next week, when it takes delivery of two test versions of the DPX/20, said Jim Harris, coordinator of technical services. The department installed a DPX/2 a year ago but needs more processing power, he said.

## DG beefs up systems line with MV minis, disk array

BY KIM S. NASH  
CW STAFF

WESTBORO, Mass. — Data General Corp. puffed up its proprietary systems line last week with the release of two new MV minicomputers — one at the top and one midrange — and a high availability disk array (HADA) for the new models.

While users interviewed last week applauded the new products, noting DG's seemingly strong commitment to MV, most said they are content with the status quo. Chief Executive Officer Ron Skates said that the firm's poor financial performance recently is due largely to MV sales, which are dropping at a faster rate than Avion sales are expanding [CW, April 6].

Carpenter Paper Co. in Grand Rapids, Mich., runs inventory sales and financial applications on a high-end MV/40000, which DG upgraded with its new MV/60000. "Response time is great. There's no need for a new machine," said Doug Kroll, data

processing manager.

Operating at between 27 and 108 Dhrystone millions of instructions per second (MIPS), the MV/60000 doubles the per-

The MV/35000 is offered in configurations with up to six processors and is rated at between 9 and 54 Dhrystone MIPS. That is 40% faster than its predecessor, the MV/30000, DG said.

The company said it took "at least 10 first-day orders" for the new computers and HADA systems, including sales to Track Data Corp., a stock market service in Brooklyn, N.Y., and

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Availability	June	August


formance of the MV/40000.

DG is targeting the midlevel MV/35000 and the high-end MV/60000 at existing users who need more processing power or want to consolidate several smaller existing systems, said Dave Ellenberger, vice president of marketing for the MV.

Springfield Technical Community College in Springfield, Mass.

HADA is a storage subsystem that uses redundant array of inexpensive disk technology to stop downtime and save data when a drive or bus fails. Pricing for the HADA/MV, due to ship in June, starts at \$42,000.





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# Pushing global messaging to its limit

*SmithKline backbone allows transmission of 'information envelopes'*

BY JOANIE M. WEXLER  
CW STAFF

PHILADELPHIA — Pharmaceuticals firm SmithKline Beecham is leveraging its global messaging backbone to carry not only electronic mail but a myriad of other types of corporate traffic headed for multiple, far-flung destinations.

The company is packing voice, fax, telex, mailgrams and personal computer files into information envelopes that traverse the firm's 160 sites worldwide.

The network will be accessible to traveling employees for whom the centralized printing of reports, for example, does little good, said Sam Shiels, director of telecommunications at the firm's U.S. headquarters here.

"We view our mail system as a transport with the capability of carrying envelopes addressed to multiple people. What you put in the envelope doesn't matter," Shiels said.

## A new trend

The SmithKline scenario marks the beginning of a corporate trend to exploit messaging technology, according to Nina Burns, principal at Network Marketing

Solutions International, a consultancy in Menlo Park, Calif.

Creative uses of the mail network are cropping up in such sites as Florida Power Corp., where an application automatically tracks weather conditions and alerts appropriate managers across the messaging network when power supplies are in jeopardy, Burns noted.

SmithKline just added an X.400 link to the outside carrier service it uses to hook into the various global messaging services that its vendors and customers subscribe to. An X.400-transported document or message costs about 75 cents, compared with \$300- to \$400-a-month dedicated links SmithKline would need to communicate with all its partners, Shiels said.

In fact, the Open Systems Interconnect X.400 message standard "has always been meant to carry more than just mail," Burns added.

Shiels explained that to the end user, using the messaging system for sending and retriev-

ing information is more attractive than setting up file transfers. This is because the latter option allows only point-to-point communications, requires the burdensome use of utility programs and requires the recipient to be on-line at the time of the transfer, he said.

SmithKline's most recent messaging application has been to digitize and transport to its UK offices the 900K-byte voice file it creates every day as part of an intracompany news service. "We wanted to run the same voice stories in the UK sys-

tem but didn't want to have to rerecord an analog voice file over potentially poor transmission facilities to another tape recorder in our London office," Shiels explained.

SmithKline put a card in a PC that converts the voice to a digital data file that is pumped over the messaging system and then reverses the process back to analog form. The firm chose to transport the information via the mail network in part "because if we decide to add this service to



Shiels leverages E-mail systems

our offices in Australia and Belgium, we just update the distribution list" rather than having to make separate calls every day to each site, Shiels explained.

To achieve the consolidation benefits of bundling traffic, the firm first had to integrate its disparate E-mail engines, which, corporatewide, include IBM's OfficeVision, Digital Equipment Corp.'s All-In-1, 3Com Corp.'s 3+ Mail, Wang Laboratories, Inc.'s Office and Lotus Development Corp.'s CC:Mail. SmithKline currently does this through mainframe-based SoftSwitch Central translation software from SoftSwitch, Inc., based here.

## Porting soon

SoftSwitch will port its software to Unix on symmetrical multiprocessing platforms early this summer, said Mike Zisman, SoftSwitch president.

Shiels said SmithKline is considering the vendor's distributed gateway platform because of an infiltration of local-area networks at his company.

Today, however, SmithKline dumps all its externally bound traffic from its mainframe across one low-speed link into another Softswitch Central gateway run by Washington, D.C.-based carrier TRT/FTC Communications, Inc. TRT/FTC portions out the traffic to the appropriate services, Shiels explained.

# System snafu slows flights

BY JEAN S. BOZMAN  
CW STAFF

FREMONT, Calif. — A computer glitch snarled West Coast air traffic for several hours Wednesday morning after a Federal Aviation Administration (FAA) computer failed.

The problem began when an IBM 3083 at a regional tracking station here crashed and temporarily removed identification labels from radar screens. The FAA center controls air traffic from Oregon to Los Angeles and routes to Pacific cities such as Tokyo and Seoul, South Korea.

The FAA switched to an older, backup computer and then ordered all planes to increase their separation from 3 to 20 miles for safety reasons. Air traffic controllers reverted to radio and manual flight-plan handling. The average delay was one hour, but hundreds of flights lagged throughout the day.

Similar disruptions occur yearly, said Ron Wilson, a spokesman for San Francisco International Airport. "The FAA computer failures generally don't last long — just long enough to screw things up."

Projects designed to improve software used in the FAA's tracking systems and the hardware and software used in control towers are well under way, but they are not expected to yield benefits for two years.

## Nosediving system

Software is suspected as the reason the 5-year-old IBM 3083 went down at 8:18 a.m. "We had a failure on the primary system," said Chuck Warner, air traffic manager of the FAA center in Fremont. Warner said an older backup computer switched on shortly after the glitch occurred, but the FAA elected to run diagnostics on the IBM 3083 before bringing it back on-line at 10:40 a.m.

The older system supports ID tags on screens, but it does not process flight-plan data passed between FAA centers. The system is due to receive a software upgrade next week, according to Warner.

Similar FAA computer failures have struck periodically in the past, including an August 1988 incident at the FAA regional tracking station in Nashua, N.H., where a software upgrade resulted in the loss of ID labels from radar screens for three hours.

The incident occurred several hours after the installation of a software upgrade to an FAA air-traffic control program. As in last week's incident, the FAA reverted to older, manual procedures to direct air traffic.

# Net managers mull future of private corporate backbones

BY JOANIE M. WEXLER  
CW STAFF

NEW YORK — Throngs of networking professionals gathered here last week at a Communications Managers Association (CMA) meeting to glean information to help them decide the fate of their aging private backbones.

Record-breaking numbers of telecommunications managers from financial firms, insurance companies, government agencies and other large organizations attended a CMA seminar on broadband networks. Several indicated that their window for determining what combination of network schemes will replace their depreciating T1 networks is shrinking and that the livelihood of today's private corporate backbone is in jeopardy.

For example, the manager of network engineering at a large New York bank said he expects changes to his private T1/T3 backbone to begin this year, with a large shift to public network services. A major reason, he said, is that public networking is a less risky way to gain education about technologies such as frame relay and Switched Multimega-

bit Data Services (SMDS).

"If it doesn't work out, you just turn the service off" and do not get stuck with equipment purchase commitments, he said. He added that he would not be surprised if more than 50% of corporate networks were based on public services by 1995, compared with 20% to 25% today.

## Change expected

Global companies in particular expressed intentions to turn largely to frame- and cell-based switching services from public carriers for the any-to-any connectivity they afford.

Swiss Bank Corp., for example, plans to move its voice traffic onto an AT&T virtual private network and take advantage of as many global dial-up, packet-switching technologies as possible, said David Pao, an assistant treasurer with telecommunications responsibilities at the firm.

"Our major outstanding question right now is, can we bypass frame relay and wait for SMDS?" he asked.

Today, frame relay is a point-to-point technology, while SMDS is a switched-carrier service that provides any-to-any networking. Frame relay is cur-

rently slated to max out at slower speeds than SMDS, but it is available both on private networking equipment and as a public service from local and long-distance carriers.

SMDS is lagging frame relay in availability, pricing information and commitments by interexchange carriers to link pockets of SMDS service offered by regional Bell operating companies (RBOC). It also requires a more expensive upgrade to user premises equipment than frame relay.

One CMA speaker, Tom Nolle, president of CIMI Corp., a consultancy in Voorhees, N.J., said, "No one emerging technology will be a universal network strategy." He and other speakers also said the mix of frame relay, SMDS and other technologies users will employ will depend on their applications.

Nevertheless, several users expressed concern about whether frame relay or SMDS would "win out," and they questioned telephone company commitments to supporting several high-speed packet-oriented technologies.

"We want to get into something we think is the wave of the future, and right now we don't know what technology will knock the bottom out of the other," said Stanley Lefkow, a vice president at Congress Talcott Corp., a financial firm here.

"Some RBOCs don't know which way they're going to go" with respect to frame relay or SMDS, agreed Frank J. Rezac, project manager at the office of telecommunications control for the city of New York. "The confidence level is not out there yet with the local telephone companies' ability to handle data networking."

A senior telecommunications analyst at a large New York investment banking firm said his company is at a transition point with its T1 backbone network because the "equipment is getting pretty old, and we want to see what the carriers will be able to offer."

## Reasons to wait

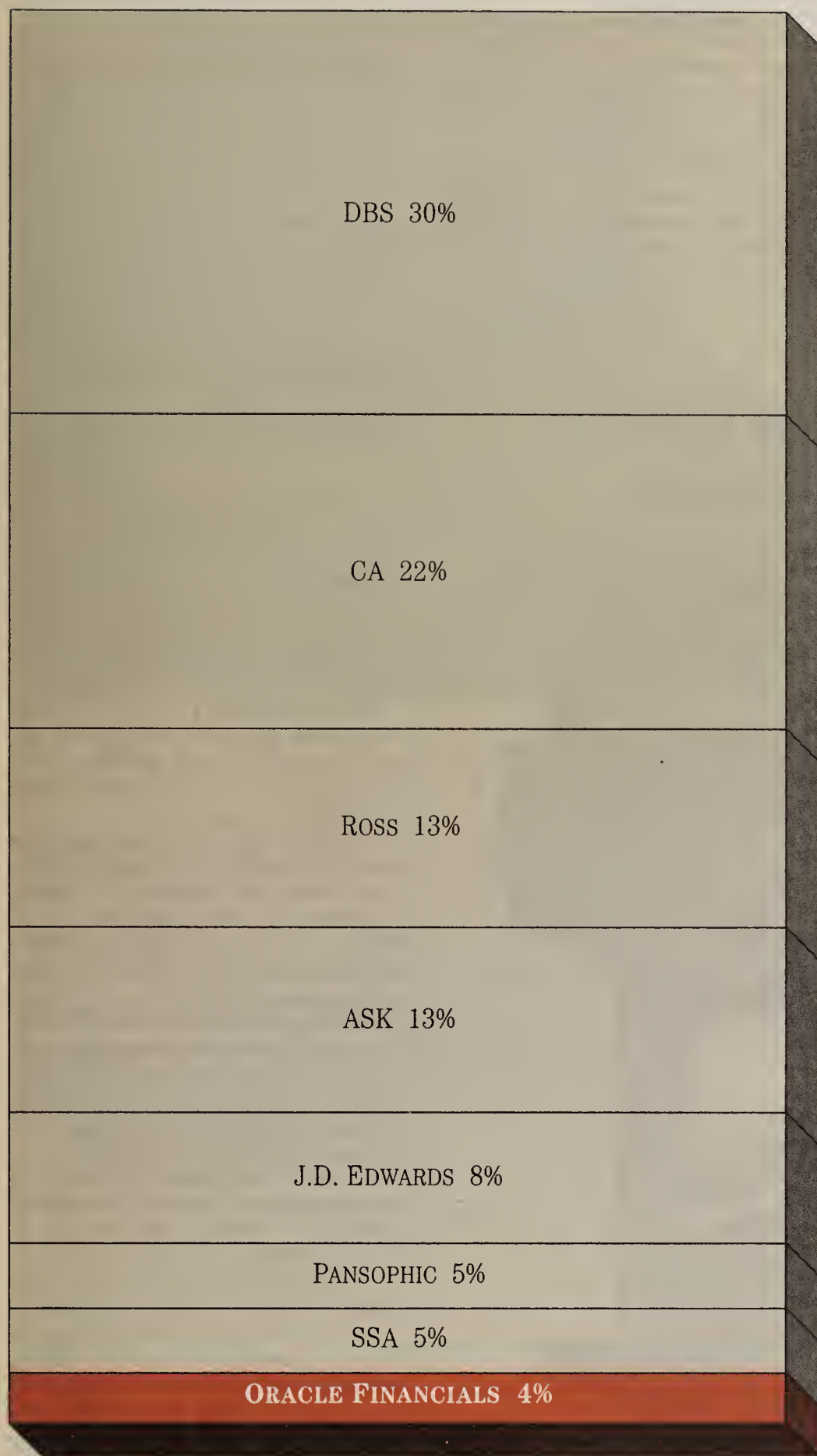
The user said, however, that because of several outstanding unresolved issues, "we won't touch frame relay for a year."

One issue is security, he explained: "If I go into a public frame-relay network with all my inside trading information, I don't know where it's going."

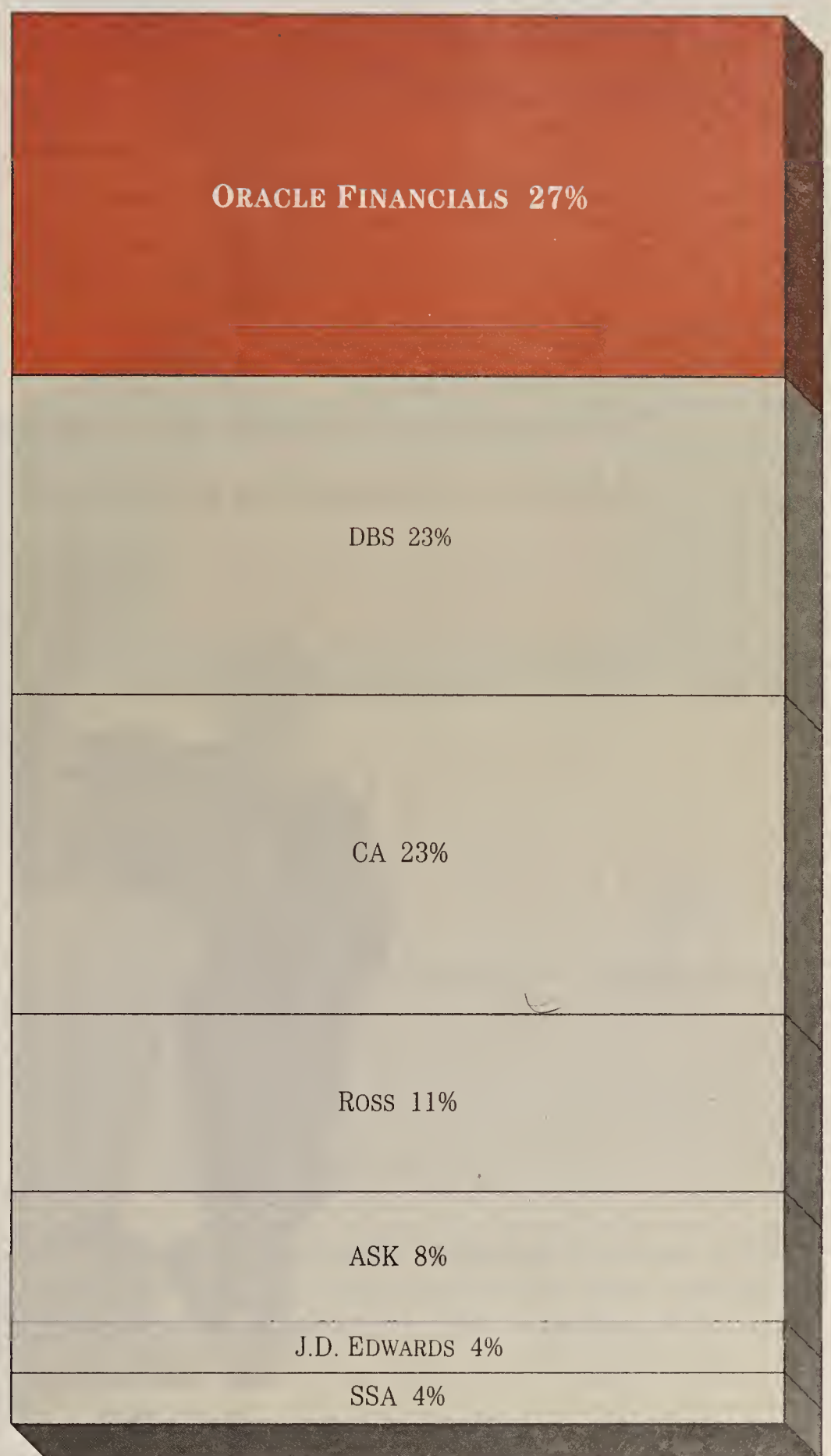
He also said diversity is a concern because it is not clear if frame-relay carriers in his area will offer the service out of more than one point of presence. Also unclear is the state of multiprotocol routers, which do not yet support congestion control mechanisms needed for end-to-end reliability of packet throughput in a frame-relay network.



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# N.Y. primaries go high-tech with imaging system

BY THOMAS HOFFMAN  
CW STAFF

NEW YORK — Voters may be unsure about whom to vote for in presidential primaries, but technology is making the voting process easier once they make their choice.

The New York City Board of Elections last week deployed a signature verification imaging system — Signature Capture, Reproduction and Imaging System for the Board of Elections, or SCRIBE — that streamlines the voting process by locating each voter's name in a database.

During last week's primary here, vot-

ing was easier for voters and poll takers, and use of the system shortened waiting lines at polling booths. Daniel De-Francesco, executive director of the Board of Elections, said he did not yet have any statistics on how much faster SCRIBE made the voting process compared with former operations; however, he said that once the system is fully on-line next year, SCRIBE will enable the city to reduce man-hours by a minimum of 25%.

The Board of Elections purchased the system for \$9.1 million.

Developed by Andersen Consulting, the client/server system uses Hewlett-

Packard Co.'s Advanced Image Management Software (AIMS) residing on an HP 9000 Model 825 running HP/UX, HP's version of Unix. HP/UX controls, maintains and uploads database and signature data to an IBM 3090 mainframe, according to Robert Tyre, Andersen's associate partner on the project.

Users participate in the system by writing their names with an electronic stylus. A scanning workstation inputs data to SCRIBE. An indexing workstation that provides access to the Election Administration System — a mainframe-based voter registration database that interfaces with SCRIBE — then indexes

voter registration document images and captures signature images. An inquiry workstation is used primarily to perform on-line inquiries and reviews of indexed documents and signatures. The workstations, HP 80386-based personal computers running Microsoft Corp.'s Windows 3.1, are linked over an Ethernet local-area network.

The system was first used last week in Brooklyn and the Bronx, with implementation to follow in Staten Island by September. Tyre said Manhattan and Queens will not be able to go on-line until next year. When the system is fully implemented next year, 3 million voters and 23,000 election inspectors will interface with what will eventually be one of the world's largest election imaging systems.

## This printer will still be productive when Michael becomes computer manager.



Facit's new volume printer, the Facit E950, is designed for really demanding applications. It handles round-the-clock operations at 320 lines per minute and features Facit's new FlexForce print head which can produce over 1,500,000,000 characters (that's 1.5 billion!) with no reduction in print quality.

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# FACIT

Tough Printers for Tough Applications

## Altai tries talking scheduling system

BY JOHANNA AMBROSIO  
CW STAFF

ARLINGTON, Texas — It turns out that you can teach an old computer new tricks. Or so Altai Software is hoping with its plan to add a voice-recognition front end to its mainframe job scheduling system.

With ZekeSpeak, end users and data center staff members can call into the host via telephone to ask about the status of jobs or issue verbal commands for the computer to run specific jobs.

"It's not a Touch-Tone system," said James P. Williams, Altai's president. "Because ZekeSpeak recognizes full verbal commands, it puts automation in the hands of end users so they can control their own destiny. And it gets data center personnel out of the loop."

ZekeSpeak can also be set up to regularly notify a group of users about a system activity, and users can add their own messages. Data center operations staff can define the parameters around which end users can override certain jobs.

Although the product will not enter beta testing until the end of the month, prospective customers said they are already impressed.

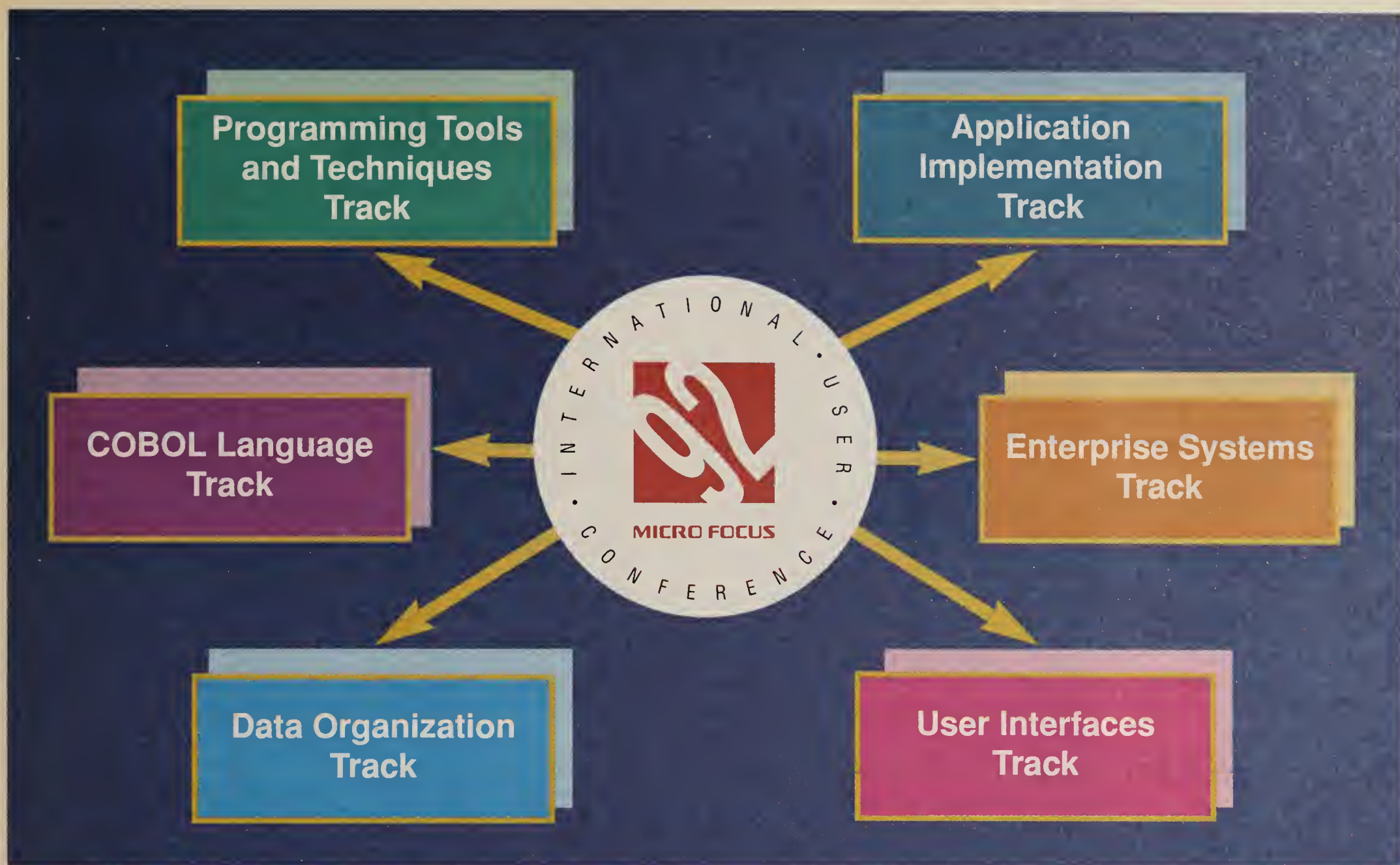
"I really like the idea," said Joe Novoskielski, manager of the information systems center at Shared Medical Systems, Inc. in Malvern, Pa. "It can simplify scheduling and eliminate key input errors." Shared Medical currently uses scheduling packages from Computer Associates International, Inc.

Novoskielski said he expects to make a decision within two months about whether to purchase ZekeSpeak and Zeke, the mainframe-based scheduling package with which ZekeSpeak interacts.

John Buckler, manager of technical services at the Continuum Co. in Austin, Texas, and an Altai customer, said he is looking at Zeke and ZekeSpeak to help with "middle-of-the-night support queries" from operations personnel and end-user queries. Continuum currently uses Candle Computer Corp.'s AF Operator package.

ZekeSpeak runs on a DOS-based personal computer, and there are plans for an OS/2 version by mid-July, Altai executives said. Pricing starts at \$95,000, which includes the mainframe version as well as ZekeSpeak. Discounts are available for current Zeke customers.





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# Conn. revenue services distributes programming

*Department's move from mainframe to PC network saves taxpayers \$15,000 to \$20,000 a month*

BY ELLIS BOOKER  
CW STAFF

HARTFORD, Conn. — April 15 is still a couple of days away, but the state of Connecticut's Department of Revenue Services is already bragging about its own refund: \$15,000 to \$20,000 a month saved by moving 90% of its Cobol development efforts off a mainframe and onto a network of personal computers.

"The selling point to the data center folks is that our production is still on the mainframe, but we can develop faster, better systems" on the PC, said Jeff Zajac, a data processing technical systems analyst for the state.

He championed the downsiz-

ing effort despite skepticism from the data center staff, who manage the IBM 3090 MVS/ESA mainframe that runs the revenue department's 45 or so production applications.

## Anything is possible

"They just didn't think it could be done," reported Zajac, who has demonstrated that even 30,000- to 40,000-line programs built on an 80386-class PC "compile clean and run clean" on the mainframe.

Although the data center is billing Zajac for less maintenance and time-sharing costs (the bulk of the department's estimated cost savings), it will reap a net gain in applications because of

improved programmer productivity, he pointed out.

After a pilot test conducted at the end of 1990, Zajac put the distributed programming approach into production in the middle of last year.

Analysts agreed that PC-based development of mainframe applications has come a long way. "There's not much mainframe software that can't be developed on the PC," said George Schussel, president of Digital Consulting, Inc. in Andover, Mass.

In the case of PC-developed Cobol code, for instance, the amount of "tweaking" required after compiling for the mainframe is minuscule, Schussel

said. "For every 100,000 lines of Cobol, 99.997% will run cold," he said.

In addition to maintaining old Cobol programs, the revenue department, with the aid of Chicago-based Andersen Consulting, used a Banyan Systems, Inc. Vines-based PC local-area network to develop systems to support Connecticut's recently adopted personal income tax. Now in production, the modular tax system includes some 30 to 40 programs that were completely written and debugged with Cobol and CICS tools from Computer Associates International, Inc.'s CA-Realia by a staff of 25 programmers.

"I can't put an absolute num-

ber on our productivity gains," Zajac said. "But just considering the on-line debugger facility, I'd guess we're doing 2.5 times to 3 times as much work. On a PC, my developers can compile code 100 times a day instead of 20 recompiles a day through the mainframe."

Development on a PC is a fast way to gain some of the benefits of downsizing without having to invest in re-engineering applications, concurred Mark Sokol, a CA executive who oversees the CA-Realia product line. He added it can also be an entree to true client/server computing.

Indeed, the Connecticut Department of Revenue plans to move its first application entirely off the mainframe and onto the LAN this summer. The LAN application, an inquiry system for Internal Revenue Service data, should be in production by August, Zajac said.

# IRS seeks to cash in on third IS overhaul

CONTINUED FROM PAGE 1

components of these computers are so old and brittle that they literally crumble when removed for maintenance," Peterson said.

But all that will change, Peterson said. Indeed, the IRS is in the early stages of its third attempt in 25 years to overhaul its systems. This time the project will succeed, tax officials said.

The scope of the effort is staggering, even by government standards: 10 years, \$8 billion, 60 major projects, two dozen megabuck acquisitions, 20 million lines of new software code and 308 people just to manage the procurements. And with 125 million users, any mistakes are likely to be noticed.

## Additional challenges

As daunting as the technology upgrade is, reshaping the agency to take advantage of it is equally difficult, according to Henry H. Philcox, the IRS' chief information officer. "The biggest challenge is that the organizational, business and technology strategies all have to be aligned, or we won't get the benefits out of this," he said.

Work processes will have to be analyzed and adapted, incentive schemes overhauled for thousands of employees, organizational charts redrawn and training programs put in place. "It's a massive change-management challenge," Philcox said.

Despite the difficulties, the IRS has already made measurable progress. "For the 10 million taxpayers who will file their returns electronically this year, the future is here," Peterson said.

The IRS has a number of promising pilot projects under way, including one that for the first time brings all of a taxpayer's data together in one place so most inquiries can be resolved with one telephone call. According to Peterson, giving employees access to more information eliminated 900,000 unnecessary IRS/taxpayer contacts last year.

In another pilot, 117,000 Ohio taxpayers have filed simple returns this year using push-button telephones. In yet another pilot, taxpayers with personal computers and special software

are printing their 1040s on forms that can be scanned at IRS service centers. These schemes reduce tax preparers effort, speed processing and greatly reduce error rates.

Still, much remains to be done, and history is not reassuring. In 1968, the IRS set out to update its systems but abandoned the effort a decade later amid congressional concerns about cost and data security. In 1982, a new redesign effort was started, but it too was scrubbed four years later for a variety of reasons, most of which were related to management problems at the agency. Processing in 1985 was a near disaster as the cutover to new mainframes and software caused major delays in processing returns and mailing refunds.

Partly in response to the man-

agement problems, the IRS reorganized its headquarters staff and two years ago tapped Philcox as its first CIO. Last week,

## System overload

*Current IRS computers annually process:*

- 1.7 billion pieces of paper
- 200 million returns
- \$1 trillion in receipts

Source: Internal Revenue Service

Philcox said that this modernization drive will succeed because the IRS has planned more carefully and has taken pains to address issues ignored in earlier efforts. "This is the difference," said Philcox, pointing to the recently published, 400-page "Design Master Plan — A Brief Overview."

And this time, the IRS will get some help managing the hundreds of contractors and subcontractors involved in the modernization. In December, the agency awarded a 12-year, \$300 million contract to TRW, Inc. to provide planning, systems integration support, quality assurance and other services to ensure that all the new systems fit together and that the transition from the old systems moves as smoothly as possible.

## A brighter picture

Things have improved, according to the U.S. General Accounting Office (GAO). Two weeks ago, Howard G. Rhile, a GAO division director, told a congressional panel, "Were we appearing before this subcommittee a few years ago, we would be painting a much less optimistic picture of IRS' chances of success."

Rhile said some of the GAO's earlier worries had been dispelled but others had not. For example, he said, scanning technology may not be up to the data capture demands the IRS has in mind. "This is not a mature technology," he said.

But Philcox said the IRS is now getting 90% accuracy scanning typed data and better than 60% on handprinted figures. He said advanced character-recognition techniques — based on artificial neural networks — will improve accuracy. "We think we are on safe ground. We are not pushing the edge of the envelope," he said.

Philcox acknowledged some worries, however, including one about how the IRS will thread its way through the procurement mine field. The GAO said flaws in IRS procurement procedures caused a \$1.4 billion project to be delayed unnecessarily by protests and another to be canceled when it failed to attract enough bids at acceptable prices.

# Paying taxes in digital fashion

The IRS' existing systems are mostly batch mainframe and stand-alone mini-computer systems that are literally surrounded by tons of paper and magnetic tapes. Almost no data is available on-line, and data is moved between sites by shipping tapes back and forth.

Tax returns keyed in at the 10 regional service centers cannot be completely validated there because the tax account master files are maintained at the IRS' Martinsburg, W. Va., data center.

The IRS wants to change that. It hopes that by the year 2000, 20% to 25% of all returns will come in electronically. Those that do not will be scanned, and the form will be digitized and placed in a database. Handwritten characters that software does not recognize will be keyed in from forms images displayed at workstations.

At the heart of the IRS' approach is a plan to pull together all the data about taxpayers and their returns and put it on-line in a database. Currently, 98% of that data is available only

from original documents and via printouts from batch files.

Applications now centralized will be distributed via client/server architectures on local-area networks attached to a few mainframes via a 1.5M bit/sec. wide-area network. The mainframes will do the initial processing of tax returns, analyze and route cases to IRS field staff and act as enterprisewide data servers.

IRS CIO Henry H. Philcox said the new systems are being built around the following


principles:

- Federal standards for open systems.
- A standard software engineering methodology.
- A central repository of data and process definitions.
- A standard suite of computer-aided software engineering tools.
- A small number — perhaps three — of database management systems.

GARY H. ANTHERS







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Architect

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# There's no time for downtime

CONTINUED FROM PAGE 1

as some call it, is falling far short of the scheduled outages that used to take place on weekend nights during the 1970s and '80s. Back then, many morning hours were available each weekend during scheduled batch-processing cycles. On-line processing of real-time data requests was not a significant problem because companies were focused on the needs of U.S. computer users.

But those who would put all their data processing eggs into one basket should beware, analysts said. "The greatest risk of consolidation is the risk of having a single point of failure," said Thomas Blitz, president of Compass America, Inc., a Herndon, Va.-based consulting firm that specializes in data center operations efficiency.

Without proper planning, the trend toward consolidating data centers into global megacenters could backfire, and even small interruptions could inconvenience users around the world.

## Never closed

In the 1990s, airlines and banks are finding their international customers dialing into the central mainframes at all hours of the night, which means software upgrades must be rushed to keep planned downtime within the 30- to 60-minute weekly "window" allotted for maintenance at some of the largest sites.

"The global marketplace is making it more likely than ever that any downtime is going to affect somebody [somewhere]," said Frank Gens, an analyst at Technology Investment Strategies Corp. in Framingham, Mass. "Any time of the day, any time of the week, someone's holiday is always going to be someone else's workday."

So the goal for many data centers is to inconvenience as few people as possible for the shortest period of time.

With the increasing demands of global users, information systems managers are redesigning their scheduled downtime procedures — cutting the time allotted for upgrading software by

stable at other sites. "A lot of data centers wait unless they absolutely have to have the functions in a new release," said Leonard Eckhaus, president of the Association for Computer Operations Management in Orange, Calif.

There are many ways to skin the maintenance cat, analysts said. These include operating under IBM's PR/SM partitioning system, which allows subsystems to be taken off-line without interrupting others.

Using IBM's VM/XA provides similar benefits.

Right now, planned monthly downtime is about 30 minutes — but Covia is trying to reduce that to 15 minutes. Just a year ago, Covia had planned for two outages of up to an hour a week each.

## Make a test run

Pretesting software before an upgrade is key, users said. At Sanwa Bank California, IBM's PR/SM partitioning facility has allowed programmers to test their software upgrades during regular banking hours, said Kurt Schneider, vice president of the Los Angeles bank's data processing system operations section. "They used to have to do all that testing in the middle of the night," he said. Actual installation of system upgrades, howev-

Gary Weis, senior vice president of networking and technology at Sears Technology. Network upgrades are managed selectively, isolating nodes to reduce outages in the 300-node Sears Technology network.

One alternative to overnight downtime is to temporarily pull one or more mainframes out of the central processing complex.

Covia removes some mainframes from the five-CPU Apollo complex for repairs during non-peak processing periods. Covia also has several smaller IBM mainframes that support two fare-quote systems, a car rental system and a hotel reservation system.

This fragmenting of functions allows the freestanding systems to keep running when the Apollo



Vale Kondo

75%, in some cases. Console automation software is helping data center managers install system upgrades at breakneck speed — using routines that send commands at machine speed, rather than human typing speed. Initial program loads that used to take an hour can now be done in 15 minutes.

Other sites try to avoid software upgrades until the new software has been shown to be

"On a network, it's much easier to route around a node or a host that requires an upgrade."

"We've had to significantly change our approach to managing downtime," said Brad Boston, vice president of systems development at United Airlines' Covia Corp. subsidiary in Denver. "We've made significant investments in customized software that allow us to load software changes on the fly."

er, is still done in the early morning hours.

When the time comes to install the upgrade, computer operators will have rehearsed the installation process. "The operations people heavily script what's going to happen," Boston said.

"Everything's highly orchestrated so people can carry out their part in minimum time," Boston noted.

At Sears Technology Services, Inc. in Schaumburg, Ill., changes are preprogrammed days before. "We have fully automated the process, but we have human beings on hand to deal with the exceptions," said

complex is taken off-line. It also allows the central complex to run undisturbed while the smaller systems are upgraded.

Upgrades to American Airlines' Sabre system's IBM Transaction Processing Facility (TPF) operating system generally run about 50 minutes while new features are tested.

## Ready to run

"The downtime is to ensure that all the features and functions are working correctly before we release the system to our customers," said Roy Smyth, managing director for Sabre engineering in Tulsa, Okla.

"The time to actually do the system load is less than 12 minutes." TPF, which runs the mainframe complex at a rate of more than 2,000 transactions per second, is updated three times a year, Smyth said.

A technique called "fanning" is also used at the central Sabre reservations complex in Tulsa on a daily basis. Sabre's seven mainframes are plugged into and out of the complex like a folding fan, Smyth said.

But Sabre's planned downtime is limited to less than an hour; major operating system upgrades are limited to three a year.

Any other off-peak time in Tulsa, including Sundays, would affect Japan's Monday morning.

## MORNING-AFTER HEADACHES

*Sometimes, an overnight software change can trigger unintended results*

- ▶ American Airlines' Sabre reservation system — described by its IS managers as a monolithic IBM TPF system — went down for 13 hours in May 1989 when a runaway software glitch stripped the labels off 1,260 disk drives.
- ▶ Chicago's O'Hare International Airport had no information on its radar scopes during much of Aug. 1, 1988, delaying 1,000 flights and affecting 2,300 takeoffs and landings at the nation's busiest airport. The night before, FAA technicians had tested new software that would have tracked more aircraft.
- ▶ On Jan. 15, 1990, large chunks of AT&T's national telephone network went down for more than eight hours after software engineers tried to upgrade the firm's Signaling System 7 network. Pieces of the new software written in C caused one New York telephone switch to suspend call processing and then signaled more than 100 other switches to update their own software. The glitch cascaded throughout the network and interrupted tens of millions of calls.

## Future technology key to cutting downtime

IS managers use existing technologies such as console-automation software — making it possible to speed the keystrokes needed to install a new piece of software — to help manage 24-hour/seven-day-a-week maintenance. But users say the best answers for reducing downtime in large IBM mainframe centers may lie with several emerging technologies.

Some users foresee greater use of IBM's Escon fiber-optic channel technology, which will plug specific mainframes into different banks of disk drives as needed. Data centers with mirrored databases would use this technique to streamline the changeover from one type of CPU to another.

American Airlines' recent switch from IBM 3380 disk drives to 3390s — performed without Escon — required that four copies of the 1.7T-byte passenger records database be made.

Right now, users can turn to robotic tape libraries, fault-toler-

ant computers and disk-array technology to move toward uninterrupted operations. In the future, users hope to add artificial intelligence to allow computers to do hardware switchovers in record time and to compress installation of an operating system from about an hour (the manual installation method) to just a few minutes. And distributed databases offer the promise of modular change-outs of hardware and software, industry analysts said.

Further fragmentation of the central IBM mainframe complex will also provide some relief. Moving disk drives to a second data center, for example, will reduce the chance of a prolonged outage.

"A distributed computing environment is a more complex environment to manage, but it offers some protection against catastrophe," said Frank Gens, an analyst at Technology Investment Strategies Corp.

JEAN S. BOZMAN



# Retailers, manufacturers applaud Quick Response

BY THOMAS HOFFMAN  
CW STAFF

NEW YORK — More than three-quarters of the retailers and manufacturers recently surveyed lauded Quick Response — a set of standard guidelines established among business partners to exchange data, goods and services — as the best way for companies to grow their businesses.

Not surprisingly, a much smaller percentage is willing to share proprietary information with suppliers and other vendors for fear of having this information passed on to competitors.

This is but one of a number of statistics revealed by Coopers & Lybrand's study of Quick Response. Respondents included 210 general managers of strategic business units at consumable products manufacturing firms and 79 general merchandising managers at consumable products retailers. All came from businesses with revenue greater than \$500 million.

## Many rewards

Partnering companies have been able to maximize Quick Response by using several key technologies, including electronic data interchange (EDI), electronic funds transfer, electronic payments and various bar-coding and scanning technologies. Retailers benefit from lower costs, reduced inventories, streamlined ordering and receiving processes and improved customer service. Manufacturers benefit from lowered inventory, established guaranteed account relationships and guaranteed shelf space.

Although most of the nation's largest retailers have started to deploy and integrate these technologies, the bulk of the retailing industry has not.

Roger Bahnsen, a manufacturing consultant at Coopers & Lybrand, noted that 77% of the manufacturers polled said Quick Response is the best way to increase their businesses. A full 70% said they think Quick Response is worth the cost and effort.

## Manufacturers lack tools

However, Bahnsen said he was surprised to find that only 40% of those manufacturers are currently implementing the tools and technologies necessary to achieve critical success factors under Quick Response. "They do not appear to be focused on customer delivery needs," Bahnsen added.

But not all manufacturers are behind the curve. For example, Black & Decker Corp., the Baltimore-based manufacturer of power tools, has EDI links with all of its major accounts as well as prototype systems for rapid re-

plenishment of inventory, including the use of bar coding, scanners and container markings.

Integrating these technologies with those of its retailing partners has helped keep Black & Decker one of the dominant players in its market. "I think

[Quick Response] is beneficial to the internal operations of the mass merchants and suppliers for serving the end user, in terms of having the right products available," said Sid Diamond, vice president of worldwide MIS at Black & Decker.

Among the retailers that have

put themselves ahead of the curve, according to industry observers, is Dillard Department Stores, Inc., a \$4.1 billion chain of more than 200 stores from Nevada to North Carolina. Dillard, based in Little Rock, Ark., has 350 corporatewide Quick Response programs and is now

on a mission to make all of its transactions paperless, according to Ray Heflin, director of Quick Response at Dillard.

Heflin said the company currently processes electronic purchase orders via EDI to more than 1,600 suppliers and plans this year to link up with an additional 800 suppliers and receive electronic invoices from them in return.

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# Dell CEO: In battle for turf, PC makers neglect user wants

*Says customers are turned off by vendors' focus on proprietary technology*

COMDEX

BY CAROL HILDEBRAND  
CW STAFF

CHICAGO — A personal computer industry that focused too much on products and too little on customer wants has produced an alienated user base that does not get the most productivity out of its technology, according to Michael Dell, chief executive officer of Dell Computer Corp.

In his Comdex/Spring '92 keynote address, Dell lambasted the PC industry for ignoring customer needs, engaging in turf wars and focusing on proprietary technology, such as the current Windows-OS/2 imbroglio. "Many companies in our industry started with a technology focus instead of a customer focus. They didn't design their products around customer needs," Dell said.

"He's absolutely right, to a point — you can't sacrifice at either end. You have to have the technology and the customer perspective," said James A. Canavino, vice president and general manager of IBM's Personal Systems Division.

Dell cited U.S. Bureau of Statistics figures that showed a yearly productivity gain of only about 1% in the 1980s. While people are getting huge amounts of work done electronically, the gain is not showing up, he said.

Productivity gains related to PC use have not blossomed as expected, acknowledged MicroAge, Inc. Vice Chairman Alan P. Hald, while speaking at a Comdex session on redefining the desktop. "Technology per se won't get you increased productivity," Hald said. "The [problem] is that personal productivity doesn't translate into organizationwide productivity. We must change the way work flows in an organization."

Eric Singleton, the information systems director at the Appraiser's Office in Orange County, Fla., said that he saw technological competition in the industry as a necessary adjunct to getting better products faster, rather than as a productivity hindrance. "A high degree of competition benefits users," he said. "I could sit here and complain about one or two things [I'd like to have], but to do so is to greatly exaggerate the shortcomings of the industry."

Still, a greater training effort could help increase user productivity, one user said. According to Anthony B. Best, data processing procurement analyst for the state of Mississippi, the learning barrier is still in place for novice computer users. He suggested that vendors could boost their training profile. "There's still lots of people out there who [are] afraid of the machines."

However, some users commented that while service and

products could always improve, the trend is already moving toward meeting customer needs.

Gene Friedman, vice president of advanced technologies, corporate technology and information systems at The Chase Manhattan Bank NA, said that he has already seen evidence of a more customer-oriented industry. "We've been talking to a lot of software vendors, and they've been very responsive in addressing our concerns." He added that vendors have been competing increasingly on customer service, and the result has been improved reaction to user needs.

Staff writer Christopher Lindquist and senior writer Michael Fitzgerald contributed to this report.



**CEO Dell:** Many firms too tied to a technology focus

## Desktop war enters next phase

BY CHRISTOPHER LINDQUIST  
and ROSEMARY HAMILTON  
CW STAFF

CHICAGO — You would think the full-scale marketing battle between IBM and Microsoft Corp. — brought to new heights at Comdex/Spring '92 with the OS/2 2.0 and Windows 3.1 debuts — would keep both companies busy enough. But no.

The two companies are already setting the stage for another confrontation: the next generation of desktop system software.

At the moment, Microsoft is showing more of its hand than is IBM. The Redmond, Wash.-based developer again stated plans to deliver the Windows New Technology (NT) 32-bit operating system by year's end. And once again, Microsoft was eager to give glimpses of the advanced, but still immature, operating system at Windows World, a trade show held concurrently with Comdex here last week.

IBM, meanwhile, said work is progressing on its own next-generation system software, which is unofficially referred to as OS/2 3.0. IBM said 3.0 could be delivered concurrently with future releases of OS/2 2.0.

For example, OS/2 2.1 is scheduled for release sometime between April 1993 and the end of next year, according to Tommy Steele, director of the IBM Programming Center in Boca Raton, Fla. It will be an extension of OS/2 2.0's existing 32-bit technology.

Meanwhile, a separate development effort that is under way will result in the so-called OS/2 3.0, a redesigned version based on a micro-kernel architecture with layers of operating system services built on top of it. This release will allow multiprocessor support as well as portability to other hardware platforms, although IBM executives would not say which systems are under consideration. However, Microsoft and IBM executives have previously hinted that IBM's first porting priority was to its RISC System/6000 architec-

ture. Microsoft has already ported NT to the Mips Computer Systems, Inc. R4000 reduced instruction set computing platform.



ture. Microsoft has already ported NT to the Mips Computer Systems, Inc. R4000 reduced instruction set computing platform.

"Don't think of this as way over the horizon before this [new-generation] software starts showing up for the tires to be kicked," Steele said.

IBM has been working with the Carnegie Mellon University's Mach 3 micro kernel, but it has not made a final decision on it, Steele said. Another contender is none other than Microsoft's Windows NT micro kernel. "This is available to us if we choose to use it," Steele said. "We have intellectual rights to the program."

Before the release of 2.1, Steele said, IBM will deliver several enhancements for 2.0, including support for Windows

### Showing its stuff

While IBM provided an overview of what lies ahead for OS/2, Microsoft put some evidence of its future plans on the Comdex show floor.

Some 54 independent software vendors demonstrated products running under early alpha versions of Windows NT last week at Windows World. Some demos crashed, others were not very robust, and performance, particularly of graphics, was less than blazing. A beta-test release of Windows NT is due in July.

Also planned is a Windows NT developers conference scheduled for July 6-8 in San Francisco, according to the company. Windows NT's commercial release is "still targeted for the end of the year," according to Steve Ballmer, Microsoft's executive vice president, worldwide sales and support group.

"We're really pleased with the [independent] vendor support for NT at this point in the life cycle," said Cameron Myhrvold, director of developer relations in the Systems Software Division at Microsoft. Myhrvold indicated that the 32-bit Windows and OS/2 sections of NT are functional, but support for DOS and Windows 16-bit applications is still being developed.



Roark Johnson/Gamma-Liaison

► Pictured with Bill Gates are representatives of the U.S. Naval Electronic Systems Engineering Activity, one of the winners of Computerworld's Windows Application Contest. Other winners are: Otis Elevator, The Prudential, R.H.H. Fantus, Ansett-Australia, Chevron Information Technology and Orlando Health Care Group.

## High-end servers beckon

Dell will push into the high end of the server market later this year, according to a key executive.

In an interview at Comdex/Spring '92 in Chicago, J. Michael O'Dell, Dell's vice president of systems development, outlined a server strategy that will culminate in an early 1993 release of a multiprocessor that supports up to four Intel Corp. 586 processors. It will also offer high-availability features, including redundant power supplies, error-correcting code random-access memory and redundant arrays of inexpensive disks, and a variety of network management software tools, such as remote diagnostics. The coming Dell Drive Array will feature full duplexing and mirroring and will support up to 5G bytes of storage. O'Dell said the base price will fall between \$13,000 and \$14,000.

Several users and analysts contacted last week said a well-executed high-end server strategy would make Dell a serious player in the corporate information server market.

Meanwhile, G. Glenn Henry, senior vice president of Dell's products group, acknowledged that Dell is farming out the design and manufacture of certain entry-level products, such as its Precision family of PCs by a partner he refused to name.

The Austin, Texas-based PC powerhouse also announced the PowerLine 450DE/2 Direct-coupled Graphics Xccelerator. This reportedly provides 7 to 10 times faster graphics performance than Super VGA by attaching a graphics subsystem directly to the microprocessor.

MICHAEL FITZGERALD and CAROL HILDEBRAND



# Windows for Pen launched

BY JAMES DALY  
CW STAFF

CHICAGO — The starting gun fired on the promising pen computing industry last week during Windows World at Comdex/Spring '92 when Microsoft Corp. shipped its long-awaited Windows for Pen Computing operating system extension. But do not expect the market to accelerate from a trot to a gallop until nearly the end of the year.

Pen computing's initial growth spurt has been slowed by a lack of pen-based personal computers and delays in delivering Windows for Pen Computing and Go Corp.'s PenPoint, analysts said. Both systems will help integrate ink capture and handwriting recognition into general-use applications. Windows for Pen Computing has missed at least three ship dates going back nearly a year, while PenPoint's Thursday arrival will be nearly three weeks later than expected.

"There's no way pen computing is going to happen in a big way this year," said Bill Lempeis, publisher of the Pleasanton, Calif.-based newsletter "Pen-vision News." Lempeis has scaled back his original 1992 pen PC sales projections from 488,000 units to 288,000 units.

Lempeis predicted that pen system sales will be sparked in early 1993 by price slashing that will see pen PCs that cost less than \$2,500 and handheld pen PCs priced at less than \$750. Improvements in handwriting recognition, display technology, battery life and durability will help developers evolve pen-based computers from vertical markets into broader horizontal business, he said.



Windows for Pen Computing and PenPoint are not the first pen-based operating systems, but both are expected to speed the transition of pen computing away from its current vertical blue-collar focus. Grid Systems Corp. and Communication Intelligence Corp. already ship PenRight and PenDOS, respectively.

PenPoint and Windows for Pen Computing will require at

least an Intel Corp. 80386-based pen machine to run efficiently, and those machines are only just beginning to arrive.

Redmond, Wash.-based Microsoft moved to make up for the delays last week, buttressing its announcement with news that Microslate, Momenta Corp., NCR Corp. and NEC Corp. all announced availability of pen computers with Windows for Pen Computing preinstalled.

Additionally, eight software vendors introduced 11 products for Windows for Pen Computing.

These included PenWare, Inc.'s PenCell spreadsheet, an adaptation of the application it produces for Momenta's pen machine.

A wave of relief swept through impatient hardware and software developers. "Finally, we can get down to selling," said Vern Rayburn, chairman of Slate Corp., which plans to release a handful of pen applications for both the Windows for Pen Computing and PenPoint platforms within 90 days.

The Windows for Pen Computing design supports 70 new pen functions, including ink capture and handwriting recognition in Windows applications.

## Notes' NLM wins mixed reviews

*Lotus expresses 'normal developers' caution' about Notes module*

BY ROSEMARY HAMILTON  
and JIM NASH  
CW STAFF

A Notes module for NetWare, the core piece of the Lotus Development Corp. and Novell, Inc. pact announced last week, made a mixed first impression on users and analysts.

One user suggested that even Lotus was not crazy about the idea of a Notes NetWare Loadable Module (NLM) until recently. Terry Rogers, Lotus' vice president of the Communications Products Division, said the company may have expressed "normal developer's caution," but regards the Notes module as "extremely important, and we are eager to do it."

The two companies, which abandoned plans for a merger in 1990, will develop and market a custom version of Notes that would plug directly into NetWare. The Notes NLM would use NetWare as its operating system. Other development efforts under way include support for the Notes messaging engine and Novell's Message Handling Service. Lotus will also begin supporting Novell's Internet Protocol Exchange/Sequence Packet Exchange transport protocol.

However, the Notes NLM, which will not be released before early 1993, caused a more curious reaction. Richard Stuckey, a partner at An-

dersen Consulting, said he understood as recently as December that Lotus was not interested in developing a Notes NLM.

While there is a benefit in allowing Notes to run on a NetWare server instead of its own dedicated server, there are drawbacks as well. "There are issues of [compromised] efficiency, security and availability," when you put a large application such as Notes on a NetWare server, said David Marshak, an analyst at Patricia Seybold's Office Computing Group in Boston.

"Most companies wouldn't run it as an NLM because it should have its own server. In our discussions with customers, they have very little interest."

Stuckey said the issue raised by Marshak was "the original concern Lotus had when they mentioned they didn't want to do this."

Nonetheless, Stuckey said, Andersen is keeping the idea of a Notes NLM as an option and could see a benefit in reducing its overall number of servers, particularly at smaller Andersen offices. The tailoring or "partial rewrite" Notes will undergo to become an NLM could address these issues.

Other Novell users contacted last week said they were uncertain whether a Notes NLM would appeal to them, primarily because of the high price tag Notes was initially known for. A Notes NLM price has not been set.

## 386SX prices drop

CONTINUED FROM PAGE 1

range would make me more interested," said Rick Meacham, end-user computing division manager at Nations Banc Services, Inc. in Nashville. Meacham's group handles information systems support for Nations Banc in Charlotte, N.C.

The next round of entry-level 386SX notebooks will typically feature 2M bytes of random-access memory and 40M-byte hard drives. New notebook systems or price cuts on existing systems are expected as early as next month from companies such as Houston-based Compaq Computer Corp. and Gateway 2000 Ltd. in Sioux Falls, S.D., as well as a raft of Taiwan, China-based suppliers.

They would follow CompuAdd Corp.'s recent debut of a \$1,595 325TX notebook and IBM's N51SX, which is selling on the street for \$1,700. An IBM spokesman said IBM will cut prices or bring out new products to compete on the low end as the market shifts, and sources near Compaq said its coming low-end notebook may start at \$1,200.

Michael Winkler, vice president and general manager of Toshiba America Information Systems, Inc., said at Comdex/Spring '92 that Toshiba is bracing for the new reality. "You will see us [introduce] a new line of low-end products in late summer that will be priced well under

\$1,500," Winkler said.

He gave few details on the upcoming notebooks but said Toshiba would make them itself, after considering an unprecedented venture into buying completed notebooks from a second source.

Winkler added that Toshiba sees prices for SX notebooks falling below the \$1,000 level late this year or early next year, and that the company is likely to second-source products to meet these price levels.

Typical pricing on a 386SX notebook right now is \$2,472.

High-end notebook pricing will likely drop as well. For instance, sources close to Texas Instruments, Inc. said TI will introduce an Intel Corp. i486-based notebook in early June that will cost less than \$3,000.

These prices could spur greater purchasing of note-

books, particularly where users have been holding off for budgetary reasons.

Paul Nelis, network specialist at Caisse Nationale de Credit Agricole's U.S. headquarters in Chicago, said, "We've got a library of notebooks which people check out, with some dedicated units for certain users. We've not used that very widely since prices have been so high, so we may very well buy more notebooks if prices drop."

"We like [Compaq's] LTE Lite, but we're really watching our money, so we'd probably only buy for evaluation right now. We'd have to consider those [low-end notebooks]," said Gene Wheeler, senior programmer at Timken Co. in Canton, Ohio.

Analysts saw the price drops as a sign that the notebook market is maturing.



► **Best one-liner.** At an OS/2 2.0 briefing, Borland CEO Philippe Kahn assured IBM Vice President Jim Cannavino, "We've done Windows apps, but we didn't inhale."

► **Best runners-up.** One wag's take on OS/2: "IBM is pushing string up a hill." As for Windows, working with Microsoft was like "dancing the dance of the Black Widow," said one Windows NT tools demonstrator.

► **Least offensive booth.** Corporate Software copped this award with an "unbooth," containing only a large window, a window-washing platform and a poster stating that the reseller was too busy working with Windows to spend time at a trade show.

► **Most sexist booth.** CA nailed this one with a tenuous link between its Windows products and a fashion show featuring scantily clad women.

► **So how big was it?** IBM execs said the finished 2.0 represents 2 million lines of new code. It took 1,200 developers two years to write new code for OS/2 1.3, a total of 850,000 new lines. It took one-third as many developers, finishing in half the time, to write 2.0 code.

► **It does Windows.** Keydata International unwrapped WindowStation, an Intel 33-MHz i486-based PC said to speed Windows applications. It has a 32-bit local bus and a Super VGA accelerator board. It costs \$3,995, but lifetime telephone support is toll-free.

► **Outtakes.** IBM planned to give away 3,000 copies of OS/2 2.0 to show attendees wearing "I Want OS/2" buttons. It will also give cut-rate deals to users until July, particularly Windows customers. . . . **Microsoft** Chairman Bill Gates hinted to a pleased audience that Microsoft Mail for Windows will find its way into a future Windows release.



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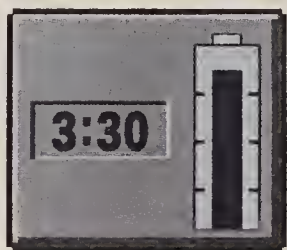
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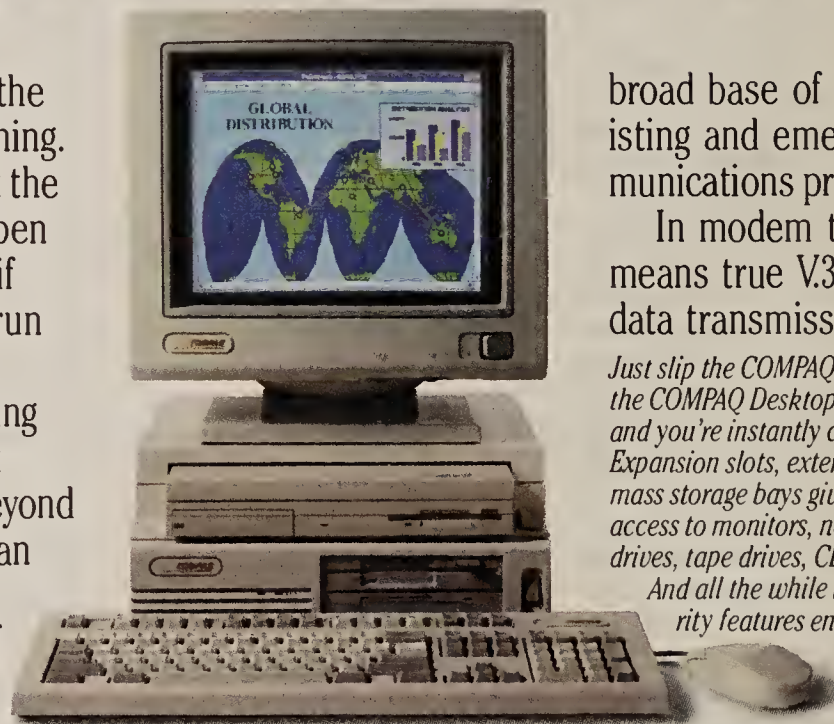
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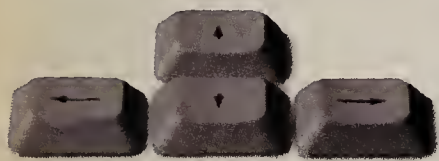
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# Sun seeks technological high ground

CONTINUED FROM PAGE 1

Sun officials declined to comment on the other systems under development.

McNealy, however, discussed the Solaris 2.0 operating system — which analysts said they expect will ship in volume by September on Scalable Processor Architecture (SPARC) and Intel Corp. platforms — and stressed the performance gains coming from its new symmetrical multiprocessing and multithreading features. "Multithreading will significantly speed up response time and execution of programs," McNealy said.

Customers and software developers who have worked on early versions of So-

laris 2.0 said initial bugs are being worked out slowly but adequately. They added, however, that 2.0 would not be ready to ship with the next batch of workstations, including the upcoming color system, which will run an enhanced version of Solaris 1.0 instead.

"Overall, I've been very impressed with Solaris 2.0. Sun has been very proactive in producing the migration kit, which is really a planning and porting tool," said Darren Curtis, a research scientist who manages a 200-workstation Sun network at Battelle, Pacific Northwest Laboratory in Richland, Wash. "They're advising

people to start migrating their applications now. Don't wait for Solaris 2.0 to be released."

## Spreading the news

In technical sessions, Sun officials doled out details on several upcoming SPARC chips, including the following: the Super-SPARC/Viking chip and low-end Tsunami chip being co-developed with Texas Instruments, Inc.; the Pinnacle chip from Ross Technology, Inc.; and the high-end Thunder chip from Metaflow Technology, Inc.

"No one processor will cover Sun's entire product line," said David Ditzel, chief technology officer at Sun. This contrasts greatly with HP and IBM, which use only one chip type for their reduced instruc-

tion set computing architectures.

Sun also shared the limelight with the SPARC International association, which strengthened its central information role with the announcement of the SPARC-Builders program (see story below).

Although there are 43 SPARC vendors shipping products today, as a group these small companies hold only 5% of the Sun-dominated SPARC market. In 1991, Sun shipped 189,000 SPARC systems while the rest of the SPARC vendors shipped 21,000 products, according to International Data Corp. in Framingham, Mass.

Several users said they were pleasantly surprised at the robust number of vendors — about 140 — hawking their wares at the exposition, which organizers said drew about 7,000 attendees.

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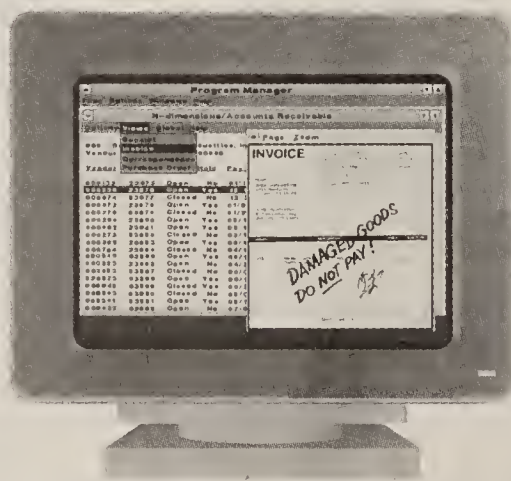
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Authorized Software Vendor

## Group sparks vendor action

The SPARC International consortium established the SPARCBuilders program last week, declaring itself a "central information resource" for companies seeking to license SPARC technologies.

The move is intended to erase the time-to-market disadvantage many SPARC vendors have experienced when seeking access to new technologies developed by Sun, the dominating force in the 250-member association. Delays of nine months to a year were typical for gaining access to new chips such as those in Sun's SPARCstation 2 line.

Under the program, SPARC International will collect a "technology portfolio," or catalog of SPARC products — such as interface specifications, CPUs, buses, graphics boards and operating systems — and test them for compliance with SPARC standards.

Once branded, the products will be available to any vendor at a base annual cost of \$750 for the technology listing.

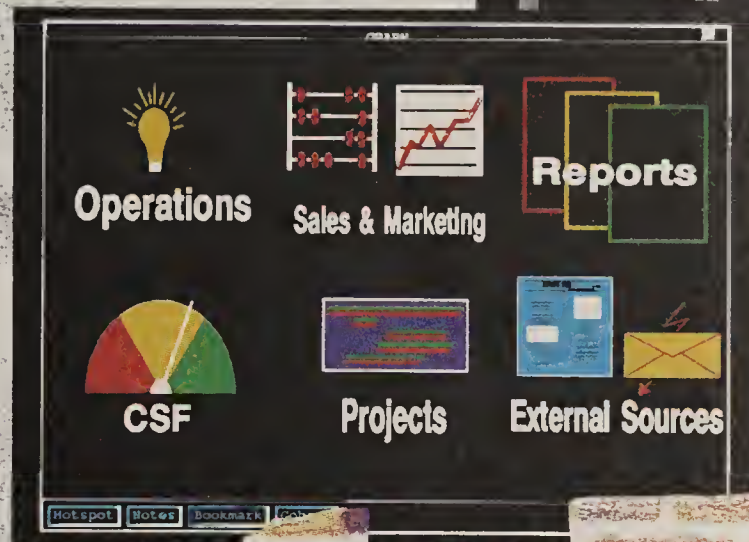
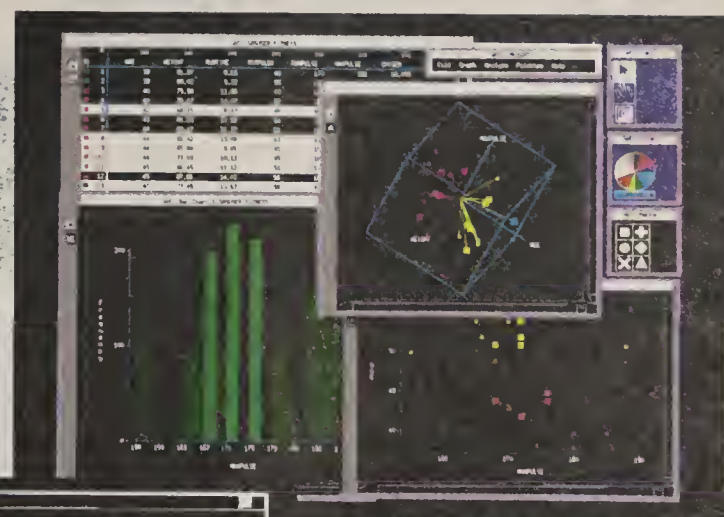
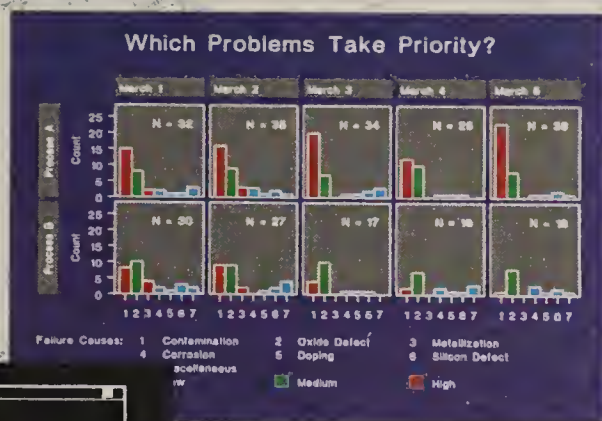
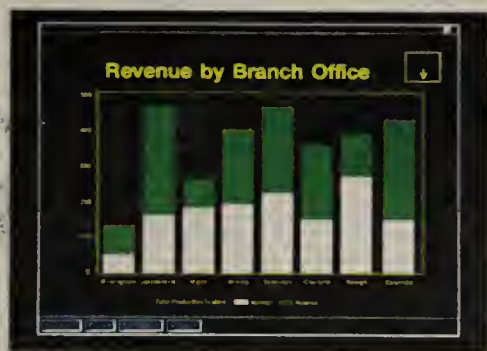
SPARC International also announced availability of the SPARC architecture for a royalty-free, one-time license fee of \$99 and a new version of the SPARC Compliance Definition (SCD) 2.0. Some 20,000 copies of the SCD 2.0 specifications will be shipped to software developers by the end of this month.

Sun President and Chief Executive Officer Scott McNealy said the easier access to SPARC technologies is meant to encourage broader market acceptance and boost volume sales. For its silicon manufacturing partners, Sun will now make its own designs available earlier in the process.

The actual licensing agreements will be handled by whatever company owns the rights to the particular SPARC product. The founding members of SPARCBuilders are Sun Microsystems Computer Corp. and SunSoft (both Sun subsidiaries), Fujitsu Ltd., LSI Logic Corp., Ross Technology, Inc. and SPARC International.

MARYFRAN JOHNSON





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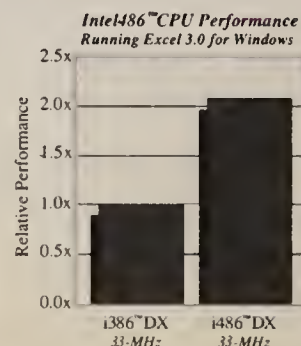


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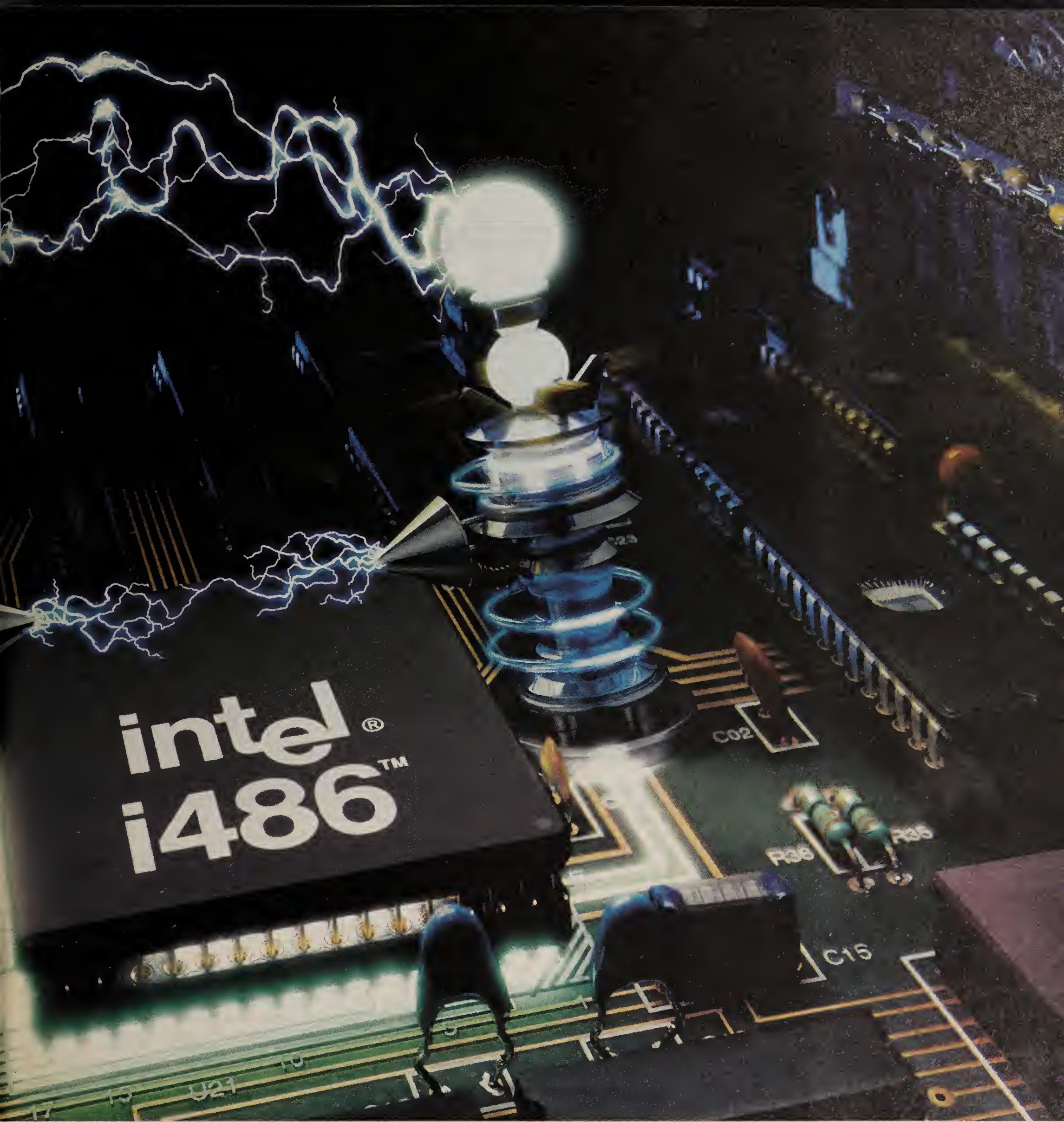
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## ADVANCED TECHNOLOGY

## Eyes in the skies show you the way to go home

*From positioning troops to locating truck drivers, global positioning systems are versatile navigational tools*

BY JEAN S. BOZMAN  
CW STAFF

**W**here in the world are you? There is one way to be absolutely, positively sure: A handheld global positioning system (GPS) that gives your exact latitude and longitude to within 45 feet. Developed for the military and used to position troops during the Persian Gulf war in Iraq, handheld GPS units began to be used commercially last year.

You do not have to be an Army tank captain to need to know your position on the Earth's surface. You might work for a coast-to-coast trucking company or be the captain of a yacht. You might even be hiking in the wilds of Yosemite and wander off the beaten track. The U.S. National Park Service uses a GPS to record data points during desert surveys of land tortoises in the Joshua Tree National Monument near Palm Springs, Calif.

GPS technology is based on a "constellation" of 16 Department of Defense (DOD) satellites that circle some 11,000 miles above the Earth, each in a different plane. By 1996, there will be 24 such satellites in place, each broadcasting its position. GPS receivers pick up the signals of at least three satellites, then triangulate the receiver's latitude and longitude.

"GPS is a newcomer to navigation," said Bob Cooper, vice president and a founder of ComGrafix, Inc., a Clearwater, Fla., maker of GPS mapping software. "We've been tracking with [long-range aid to navigation] and other radio-based systems for some time."

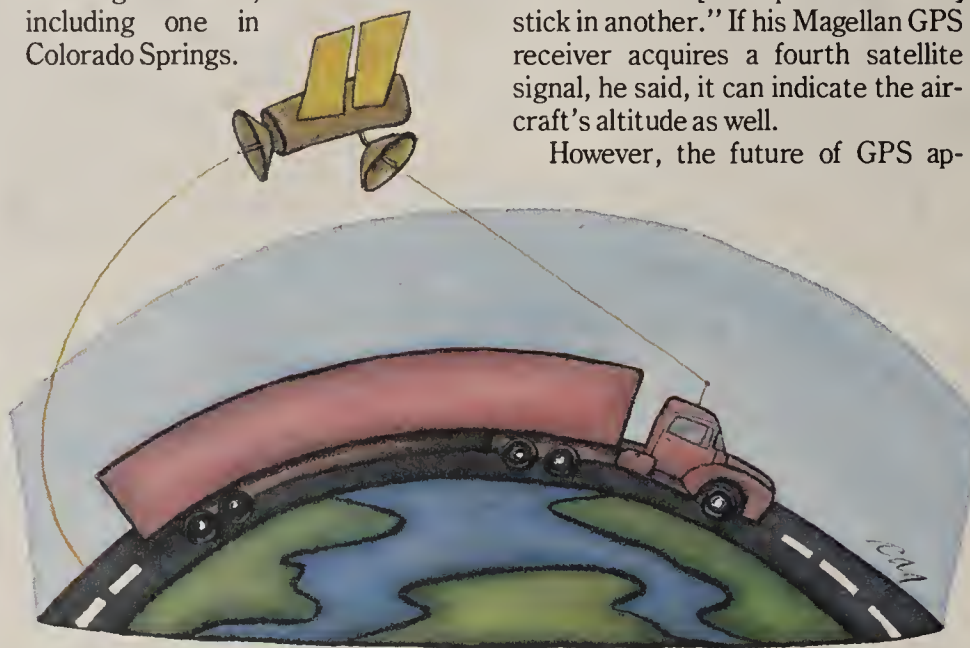
#### Steady business

Several fleet-tracking systems based on GPS employ UHF, FM radio and microwave links to relay other data about vehicle speed, fuel levels and repair problems.

There are several other key suppliers of GPS technology. San Dimas, Calif.-based Magellan Systems Corp., which makes two-pound GPS receivers based on gallium arsenide chips, sold about 3,000 units to the military during the Persian Gulf war. Qualcomm, Inc. in San Diego makes software tracking systems that combine GPS data with signals from commercial satellites and radio transmissions. ComGrafix makes a tracking system that places GPS data on road maps displayed by Apple Computer, Inc. Macintosh computers. Handheld receivers generally cost about \$2,000 each.

GPS has been widely deployed in commercial applications since the end of Desert Storm. "The government began developing GPS back in the

1970s," said Randy Hoffman, president of Magellan Systems. "They began launching satellites in the 1980s, but those satellites continue to be under the control of the U.S. military." DOD operates four GPS ground-tracking stations, including one in Colorado Springs.



Richard A. Goldberg

Military pilots continue to use GPS tools during night training missions to avoid more cumbersome navigational aids.

"The standard way of navigating

is dead-reckoning," said Jack Lawton, a helicopter instructor at Fort Ord near Monterey, Calif. "You need to have an absolute awareness of where you are at all times. Without a GPS system, you'd be holding a map in one hand and the [helicopter's throttle] stick in another." If his Magellan GPS receiver acquires a fourth satellite signal, he said, it can indicate the aircraft's altitude as well.

However, the future of GPS ap-

pears to be squarely in the commercial world — all around the globe. "One of our customers charts vessels that carry grain throughout the Caribbean," said Greg Lovingfoss,

#### Problem detector

On land, GPS technology allows operators of truck fleets to have a real-time readout of all the vehicles at all times. Some GPS-based fleet-management systems add data on vehicle speed or fuel consumption, which is sent by commercial satellite or by radio. The flow of data to dispatchers' screens turns up most problems hours before they would have been discovered through an unplanned repair stop, fleet managers said.

Many transportation fleets have added electronic mail between the central dispatching station and the truck drivers. "The dispatchers can just watch the trucks move across the screen, or they can exchange precoded messages with the truck's operator," ComGrafix's Cooper said.

Among the most used electronic messages, he said, are "Send me your [estimated time of arrival]" and the ever-popular "Send money."

## Model volcano may prove to be a lifesaver

BY ELLIS BOOKER  
CW STAFF

**S**tudied from afar, a volcanic eruption is one of nature's most spectacular sights.

Naturally, villagers and townspeople at the foot of an exploding mountain see the awesome pyrotechnics a bit differently. For them, an eruption is a direct threat to life and property.

A software program that models volcanic events is now serving a dual purpose: Helping geologists study volcanism in the abstract while providing a better way to predict the destructive path of any particular volcano and so help populated areas prepare for the peril.

#### Paper maps passe

Developed at the State University of New York in Buffalo, the personal computer-based software is a vast improvement over the paper maps that have traditionally been used to plot where the lava, mud, ash and poisonous gases produced by an erupting volcano will fall.

"Those hazard maps take two or three man-years to make," explained Michael F. Sheridan, a volcanologist and chair of the department of geology at the university.

Along with Kenneth Wohletz, a research scientist at the Los Alamos National Laboratory, Sheridan began work on the visualization software, called Erupt, about five years ago.

Sheridan said the software, which runs on an 80386- or I486-class PC, is valuable as an academic tool because it allows a researcher to play "what-if" scenarios. A geologist using Erupt can look into the future of a volcano in what is called its "repose" state and see how it might act when it enters its "crisis" phase, just before an eruption.

Sheridan has also modeled volcanoes of antiquity, including Vesuvius in Naples, Italy, which buried the Roman town of Pompeii in A.D. 69. Meanwhile, one of Sheridan's graduate students is at work on a workstation-based implementation of the software, which will permit three-dimensional views of an eruption.

That system, funded by the National Science Foundation and being implemented on a Silicon Graphics, Inc. workstation, will use far more complex calculations, involving 3-D shaded polygons, and will offer even more accurate information about the direction of material issuing from the

volcano. Eventually, digitized maps showing roads and villages nearby the volcano will be superimposed on this model.

But Sheridan said he thinks the greatest benefit of his relatively simple simulation system — it can be stored on a single floppy disk — will be in the area of prevention because the animation can overcome the difficulty of communicating safety programs to illiterate people.

"Had the people in the village area seen a simple model like this, most of their lives probably could have been saved," he said, referring to the 1985 eruption of the Nevado del Ruiz volcano in Columbia that killed an estimated 26,000 people.

With some 450 active volcanoes in the world, 25 of which are in the crisis stage, there is a call for Sheridan's software. People living at the base of Vesuvius, which last erupted in 1944, would do well to examine a simulation that Sheridan created in 1984.

"We calculated what the area of destruction might be," Sheridan said of the Vesuvius model. "And we anticipate that now, if there were no evacuations, about a quarter million people could die."







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## EDITORIAL

## What's at stake?

A few weeks back, we got a call from an IS manager who'd been quoted in a story we'd written on the ongoing issue of software licensing and pricing. He was more than a little upset because he said he didn't realize he'd be quoted in *that* kind of story, wherein he fingered specific vendors and their licensing policies.

So we applied the first acid test: Was the quote accurate? The answer was yes. Then, the second test: Was the quote in proper context? Yes, absolutely. He stood by the quote, saying it reflected how he felt. Finally, did the reporter properly identify himself and the reason for calling? Yes.

So what's the problem? "I'm afraid," he said. "I just don't want to deal with the headaches and the aggravation because I've complained. Some of these vendors can make life really miserable for you when you do."

Amazing. You mean to say that in this day of the incredibly slow-moving computer industry, there are vendors actually abusing — or threatening to abuse — customers?

Were this fear, uncertainty and doubt confined to a few customers, it would hardly be worth mention. But I saw it again on a much broader scale at a recent confab of IS managers. When their discussion of licensing and pricing policies became heated, the cry of "DON'T QUOTE ME!" rose loud and clear above the din of bitching. "We just don't want to be hassled."

Previously in this space, we've noted the peculiar way circus elephants are trained. When they are very small, they are chained to a huge stake. When fully grown, the pachyderms could rip the stake away with little effort. But they don't because, given their training, they don't think they can.

Thus it seems to be with so many customers out there. Were they fully aware of their clout and power, their fear would evaporate, and they would more fully control their destiny.

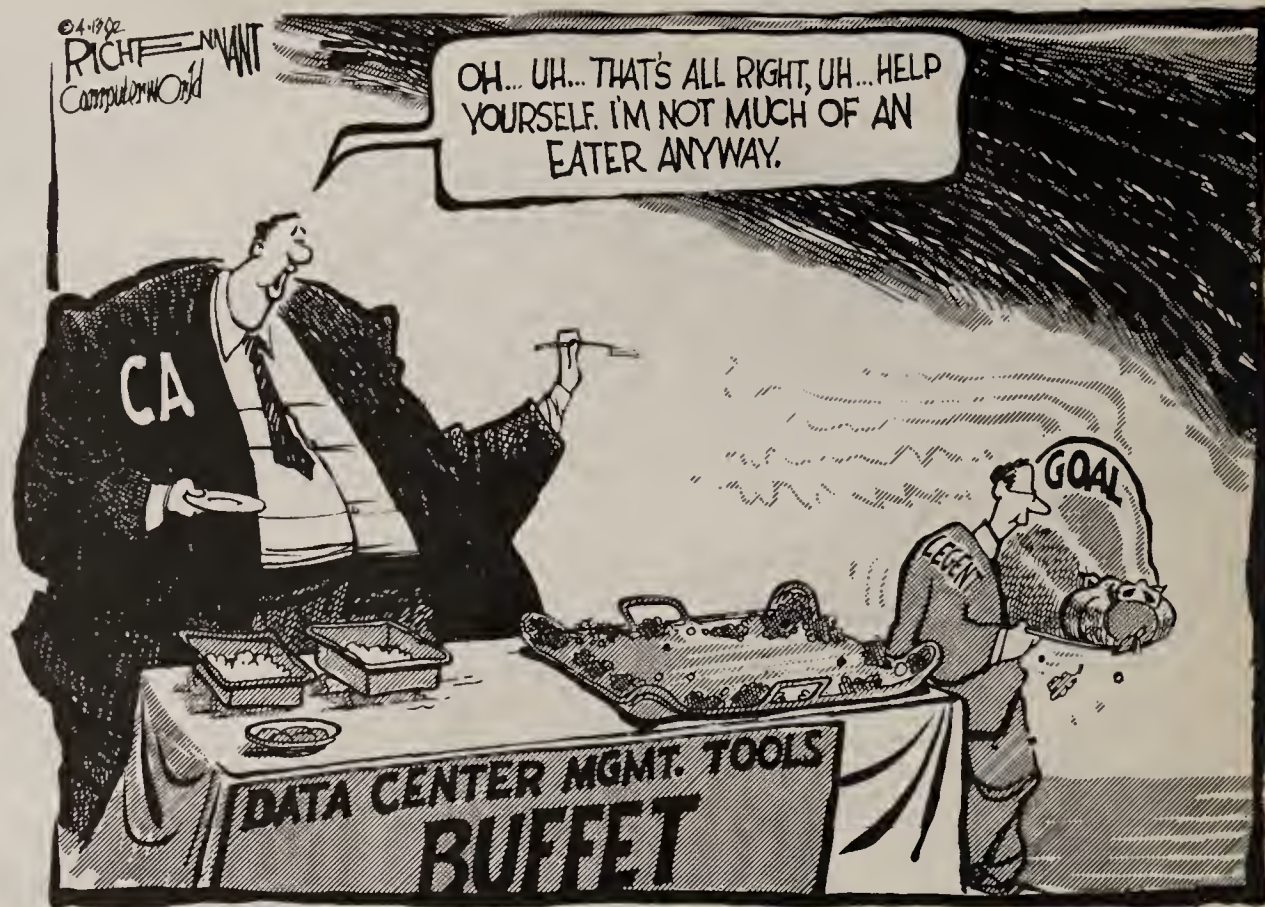
And what is the nature of this fear? Do customers believe that certain vendors will actually *do* something harmful to them? Or is it perhaps that IS managers just don't want to be bothered with dealing with threats of reprisals and saber rattling? Whatever the reality — and it probably reflects a little of both — the simpler reality of the marketplace is that when you have a lot of vendors chasing fewer and fewer big accounts, you'll witness the development of a buyers' market.

That means the customer is in control in a very real sense, and woe to the vendors that don't respect this reality.

IS managers of the world unite! You have nothing to lose but the long-gone ways of some distant past.

*Bill Laberis*

Bill Laberis, Editor in chief



## LETTERS TO THE EDITOR

## IS still stumbling over the basics

As a longtime reader of *Computerworld* and a longtime practitioner in our profession, I'd like to comment on the panacea syndrome so prevalent in our field.

Back when information systems was touted as a panacea for developing effective corporate systems, Dick Brandon, a well-known electronic data processing consultant, was asked what he thought of IS as the solution to our ills.

If I remember correctly, he said, "We ought to get payroll working first."

Neither the quote nor its message has lost its sharpness.

As a profession, we still stumble over the basics and take more pride in our tools — and our expertise with them — than in our skills applying the basics.

A few years ago, a young programmer stopped by to borrow a graphics-package manual. He had to develop several flow-chart-style charts for a presentation. I suggested he draw them manually using a template. He didn't have a template, so using the package and our multipen plotter was obviously the way to go.

I sat down, drew his charts, typed in the headings and delivered them all to him in less than an hour. When I left his office, he was still reading the user manual. I am sure that he eventually became quite proficient in the use of the package and the plotter, but at the time, their use was quite unnecessary for the effective completion of his task.

E.W. Aikens  
Manager

ICL Retail Systems, Inc.  
Irving, Texas

## Warm Fuzzo cartoon appreciated

Being from Eugene, Ore., I was very pleasantly surprised at the recognition "The 5th Wave" gave at long last to the genius of the Fuzzo brothers ["30 years ago today," CW, March 9].

Their hydropneumatic PC — a mainframe at the time — was then the talk of the Willamette Valley Users Group. It is well-known that the Fuzzo PC provided the CAD/CAM design for the first Nike waffle-soled "Web-Foot" model developed two drive-ways down and over the fence

from Irwin Fuzzo's place.

Bill Fuzzo went on to greater fame as the orchestrator of the gigantic "dancing waters" fountains. Poor Irwin returned to his first love of plumbing but never fully recovered from the injuries he suffered while testing his Fuzzo PC-controlled turbo-pressure flush toilet.

Edward A. Gardner  
Chief information officer  
Riyadh Armed  
Services Hospital  
Kingdom of Saudi Arabia

## Outsourcing: More than a matter of cost

I read with interest your March 30 editorial, "Reinsource-ments" — particularly your position that "the lasting benefits and true costs of outsourcing will come to light only over a period of time." We couldn't agree more.

In 1988, we were commissioned to perform a cost-efficiency and production-quality benchmark study for a client who was on the verge of an outsourcing decision. Our results clearly showed that the client could "in-source" its data center at a lower cost than outsourcing it by improving in the areas identified and quantified in our study.

Our client doubled the capacity of its data center, but its data center costs have been cut in half. Moreover, its unit costs have been driven down to 30% of what they were in 1988 through informed management decisions.

Our position on outsourcing,

both as illustrated by the above study and consistently reinforced by other client engagements, is that outsourcing is a management issue, not one of cost efficiency or reducing costs.

In other words, if you have the necessary information and are willing to make tough decisions, you don't need outsourcing.

Thomas Blitz  
President  
Compass America, Inc.  
Herndon, Va.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor in Chief, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701. Fax number: (508) 875-8931; MCI Mail: COMPUTERWORLD. Please include a phone number for verification.



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# The illness of the decade

MARVIN J. DAINOFF



If you haven't heard a lot about cumulative trauma disorders, or CTDs, you soon will. In fact, you may soon need to know as much about these problems as you do about service levels.

The Occupational Safety and Health Administration (OSHA) has called this problem, which is also dubbed repetitive strain injury or overuse injury, the "occupational illness of the decade."

CTDs, which typically involve pain or discomfort in hands, wrists, arms, shoulders or neck, used to be something you had to worry about only if you were working in or managing some kind of manufacturing or processing operation. These injuries were originally linked to industrial occupations such as meat packing and poultry processing.

## Now closer to home

Now, however, CTDs have started to show up in IS backyards. In recent years, computer operators have begun to manifest the same kinds of symptoms as their blue-collar brethren. By last year, the trend was already pronounced enough that San Francisco passed a city ordinance that required workplaces using computer terminals to be, in effect, "ergonomically correct." While that law has since been overturned in court, the problems that prompted it have not disappeared, and other legis-

lative and regulatory efforts are under way.

The state of California, for instance, is working to produce statewide ergonomic regulations applicable to computer terminal operators. And, at the national level, OSHA is in the process of writing general ergonomic regulations for both office and industrial workplaces.

For these reasons, CTD prevention ought to be a matter of interest and concern for IS managers and professionals. If you are going to recommend that departments or functions be computerized or sug-



Timothy Carroll

gest that processes be redesigned in ways that involve using fewer individuals to perform more computer-intensive work, you should also be knowledgeable about the possible physical hazards and how to minimize them.

## Nature of the beast

Although scientific evidence is still incomplete, CTDs are thought to arise from a combina-

tion of factors. These factors include highly repetitive work for prolonged periods of time in awkward postures, using excessive force and not pausing often enough to rest. Work-related stress has also been found to effect the severity of symptoms. Thus, pounding on a poorly designed keyboard for hours while sitting with wrist, arms and neck at awkward angles, under pressure to produce more in less time, might well make one a candidate for a CTD.

The most effective way to deal with CTDs is to keep them from happening in the first place. This is

not as easy as you may think. Simply recommending the purchase of "ergonomically correct" furniture does not solve the problem, although there are plenty of enterprising office equipment salespeople who will tell you it does.

Ergonomics has been described as the "fit" between people and the tools they use. A keyboard that is placed too high, a display screen that is too low or

a chair — even an ergonomically designed one — that is not adjusted properly may force the operator into an awkward position.

There is a story I tell often about one of my graduate students that illustrates why your job must extend beyond recommending, approving and installing computer equipment — why you must also include education about the environment in which that equipment is used.

The student in question took a summer job as a data entry operator. On her first day on the job, she was delighted to see that the company had provided ergonomically correct chairs for people doing such work. However, when she started to adjust the chair, her manager came running over and stopped her, saying, "Don't do that. These chairs are ergonomically correct. They were adjusted to the proper setting at the factory."

Why should you worry about this kind of misinformation? Well, for one thing, it has a very direct bearing on the productivity that can be achieved through automation. People who are uncomfortable — or worse, in chronic pain — do not perform effectively. And, for another, it is ultimately your responsibility to make sure the systems you recommend and implement do no harm.

Finally, if you don't address these issues now, you may find yourself answering some difficult questions from company management later, either when medical bills start rolling in or when the regulators start sending messages.

Dainoff is director of the Center for Ergonomic Research at Miami University in Oxford, Ohio.

# Information engineers can save IS' reputation

JOHN F. SHEKLETON



American businesses support most of us who fill in "systems analyst" in the job category on our annual tax form. Businesses pay our salaries, buy the tools we work with, provide much of our education and, in return, function smoothly or falter because of our labor. It's supposed to be a relationship of mutual benefit.

For many companies, however, the relationship is strained. New systems are still too slow in the making. And when they are cooked, they aren't good enough, flexible enough or adequate for the current state of business.

Those are the symptoms,

some say; the problem is communication. We've all heard the complaints: "IS doesn't understand the business." "The DP folks don't have any idea what I do or why I do it." "They don't talk my language." "They got it wrong again."

## A quasi-solution

Comments like those seem to suggest a communications problem. And, hearing them, businesses have tried to improve the situation by creating shared language and shared experiences. They have taught their IS professionals the language of the business and moved them out into other divisions.

Sound good? Not to me.

Will gaining a common language and experience solve the communication problem? To some degree. Is the communica-

tion problem the real problem? Yes and no; more no than yes.

In my opinion, these bedraggled systems come about not because of poor communication, but because of inadequate methodologies, weak or absent tools to enable them, limited management support or understanding and a work force that hasn't quite caught on to the vision of what it is to be an information engineer.

The solution is not to make information professionals better businesspeople. The solution is to make information professionals better information engineers.

Studying business is fine. But an information engineer is of value because he knows how to ask the right questions, how to discover business, sociological and cognitive systems and how to use methodological constructs such as object classes, event modeling or entity relationships in order to model the essential

nature of the business.

This information engineer also needs an integrated set of tools that will move the logical model into data structures and

**T**HE SOLUTION IS not to make information professionals better businesspeople. The solution is to make information professionals better information engineers.

executable modules.

If the information engineer doesn't know how to do his work and doesn't have the tools to do it properly, learning the business isn't going to help a whole lot. It may help a little but, then again, it may only enhance the sharing of common disappointments.

Shekleton is a senior systems analyst and part of the research and integration team at the Minneapolis Star Tribune.



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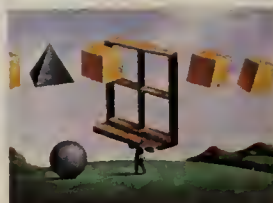
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# DESKTOP COMPUTING

PCs AND SOFTWARE • WORKSTATIONS

## Go Corp. strives to make its pen point

### ANALYSIS

BY JAMES DALY  
CW STAFF

Sit tight. The unbearable anticipation in the battle for a pen-based operating system standard is just about over.

With last week's introduction of Microsoft Corp.'s Windows for Pen Computing platform and Go Corp.'s PenPoint operating system set for unveiling this Thursday, the two paper tigers will finally get a chance to go at each other in the cold, clear reality of the marketplace.

While Windows for Pen Computing offers the safety net of full DOS compatibility, officials at Go — a tiny Foster City, Calif.-based start-up — claim that is not enough. What is needed is a whole new operating system.

"A new technology demands a completely new approach," said Jerry Kaplan, Go's chairman and co-founder.

But what exactly is PenPoint?

#### Pen interface

Unlike Windows for Pen Computing, Go's operating system was designed from the ground up to use the pen as the central interface component. It even boasts a cheery pen-and-paper metaphor. That's good.

Unfortunately, PenPoint is incompatible with DOS. Is that bad? Not necessarily, Go Vice President Michael Homer said. He noted that hardware manufacturers can install drivers that allow PenPoint to read DOS or OS/2 files.

PenPoint features a number of interesting technological wrinkles. The Notebook User Interface (NUI), for instance, is a table of contents that serves as both a central organizational and navigational base that also insulates users from the complexity

of applications and file management.

The operating system also includes the Embedded Document Architecture that lets users combine "live" data types within the same document by embedding one document inside another.

PenPoint's handwriting recognition

#### Clean slate

Go's PenPoint operating system has several new technological wrinkles:

- The Notebook User Interface is a table of contents that serves as both an organizational base and a user interface.
- The Embedded Document Architecture lets users combine "live" data types by embedding one document inside another.
- A handwriting recognition engine translates printed letters and recognizes pen-based commands, such as "X" to delete.
- Support for mobile communications and a 32-bit fully object-oriented development environment that promotes a common user interface.

ognition engine translates printed upper and lowercase letters, digits and punctuation. The NUI incorporates handwriting recognition and "gestures," or pen-generated commands such as writing an X to delete or circling to edit.

In addition, PenPoint also includes support for mobile connectivity, a compact and highly independent design and a 32-bit fully object-oriented development environment that encourages a common user interface across all applications.

On the developer side, the system offers several advantages.

Because PenPoint offers more native functionality than Windows, it is likely that a PenPoint application will require fewer lines of code than an equivalent Windows application.

But there are caveats: Some early developers claimed that PenPoint development is slowed down by a sluggish compile and test cycle.

Those assessments, however, were based on an early developer's release and are expected to be smoothed out once PenPoint starts shipping, Go officials said.

Those are challenges that many developers are willing to live with. "PenPoint is exciting because it offers something new and exciting and not just a mere extension of an existing desktop metaphor," said Ron Brown, president and chief executive officer of Notable Technologies, Inc., an Oakland, Calif.-based developer that is preparing a pen-based communications package for fall release.

#### Jumping into the fray

The excitement has already permeated the developer community, where important independent software companies like Borland International, Inc., Lotus Development Corp., WordPerfect Corp., Slate Corp and Pensoft Corp. are developing software for PenPoint.

Go has also established strong alliances with major hardware vendors. This week, IBM is expected to introduce a PenPoint-based machine that uses Intel Corp.'s 20-MHz 80386SL microprocessor and weighs approximately five pounds. NCR Corp., Grid Systems Corp., Hyundai Computer Corp. and Samsung Information Systems America, Inc. have also demonstrated pen-based machines running PenPoint.

Although the battle for the pen-based operating system standard will be a tough one, some analysts like Go's chances. In fact, Forrester Research, Inc. analyst William Bluestein predicts victory for Go. "Pen-based computing is an entirely different animal than desktop computing, and PenPoint was designed with this in mind from Day 1," Bluestein said.

Meanwhile, Microsoft is attempting "to force-fit Windows

into a new role," Bluestein added. "Its success will be limited to users who want an electronic stylus as an adjunct to their desktop PCs running Windows."

In any event, it should be an interesting summer for pen-based computing. "After so many months of talk, there are finally products we can get our hands on — and that's exciting," said Bill Lempesis, publisher of the Pleasanton, Calif.-based "Penvision News." According to Lempesis, "Now the vendors just have to convince users that they can't live without a pen machine."

## Microsoft beats Lotus as Unum office standard

BY ROSEMARY HAMILTON  
CW STAFF

PORTLAND, Maine — Microsoft Corp. recently beat out its rivals, including Lotus Development Corp., at Unum Corp., which selected its integrated set of Windows applications to replace existing DOS packages.

While Unum is moving its users to Windows at a gradual pace, Microsoft Office will eventually be used by approximately 2,500 users at the insurance company.

Microsoft Office was picked over competing products from Lotus and other vendors because "we had a whole set of selection criteria and Microsoft met it best," said John Roberts, vice president of corporate research and technology. Unum's list included usability, application integration and a solid macro programming language.

Unum recently reevaluated its desktop applications as part of its overall move to Windows as a graphical user interface. In a previous interview, Roberts said

the company had zeroed in on the application suite concept but had not yet selected a vendor. The suite appealed to Unum because applications from a single supplier provide consistency in how they look and feel.

#### Conversion required

The choice of Microsoft Office, which provides spreadsheet, word processing, graphics and mail applications in one package, will require a conversion effort at Unum. "There will be quite a bit involved there, but the feeling was the value was there" to do it, Roberts said.

Currently, Unum users run Lotus' 1-2-3, Software Publishing Corp.'s Harvard Graphics and a mix of word processing packages, Roberts said.

Although end users will be required to learn new applications, Unum has not set a deadline to install Microsoft Office. Instead, it has established it as the standard application environment for Windows, and DOS users will be required to use it when they make that switch.

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# Five vendors chop prices on 386, 486 PCs

BY CAROL HILDEBRAND  
CW STAFF

The Paul Bunyans of hardware pricing have been out in full force during recent weeks, sinking their axes into the price structures of no fewer than five per-

sonal computer vendors.

IBM, Hewlett-Packard Co., Everex Systems, Inc. Advanced Logic Research, Inc. (ALR) and Leading Edge Products, Inc. each announced price reductions on their PC lines, contributing to yet another skirmish in the con-

tinuing hardware price war.

Bruce Stephen, director of PC hardware and pricing research at International Data Corp., said the recent actions were pretty much more of the same. "There's no extra added new wrinkle here. [The vendors]

continue to be in a price-driven commodity market, and they are positioning products accordingly," he said.

Stephen did point out that with the continued erosion of prices, the 80386SX chip is rapidly becoming the entry-level

platform. "The 286 chip is now on the cut-out table," he said.

Recent actions include the following:

- **IBM.** Observers have attributed IBM's price cuts on its Model 35 and 40 — 20-MHz 386SX-based machines — to its preparation for rollouts of faster boxes based on the IBM SLC chip. A diskless Model 35 with 2M bytes of random-access memory costs \$1,310, with the line topping out at \$1,905 for a model with a Token Ring adapter.

Model 40s run from \$1,425 for the diskless version to \$1,965 for a box with a 80M-byte hard drive.

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**THE VENDORS**  
"continue to be in a price-driven commodity market, and they are positioning products accordingly."

BRUCE STEPHEN  
IDC

- **HP.** The Palo Alto, Calif.-based vendor lopped up to 23% off the price of its Vectra line of PCs. The company's lowball machine is the 386/16N Model 0, a diskless box that is priced at \$1,149. A 20-MHz 386 with 2M bytes of RAM and a 50M-byte hard drive comes in at \$1,549, while a diskless 33-MHz i486-based box will run about \$5,999.

- **Everex.** The company's STEP and TEMPO lines saw price cuts ranging from 7% to 30%. Everex's 20-MHz 386SX is now priced at \$1,429, while the 25-MHz 486SX machine dropped 28% to \$2,159.

- **ALR.** The company spotlighted upgradability by reducing CPU upgrade modules by as much as 22%. For example, including a rebate, a 386CSX/20 module is now \$399.

- **Leading Edge.** Pricing on the 386SX and DX took a tumble, dropping by up to 18%. The N3/SX20 notebook with 2M bytes of RAM and a 60M-byte hard drive dropped 17%, from \$2,399 to \$1,999. A 16-MHz 386SX box with 1M byte of RAM and a 44M-byte hard drive is now \$1,099, while a 20-MHz 386 with 2M bytes of RAM and a 130M-byte hard drive is \$1,799.

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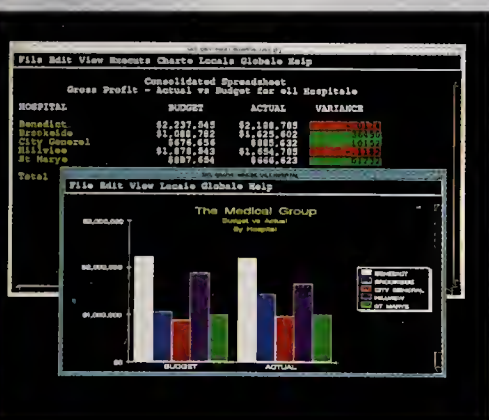




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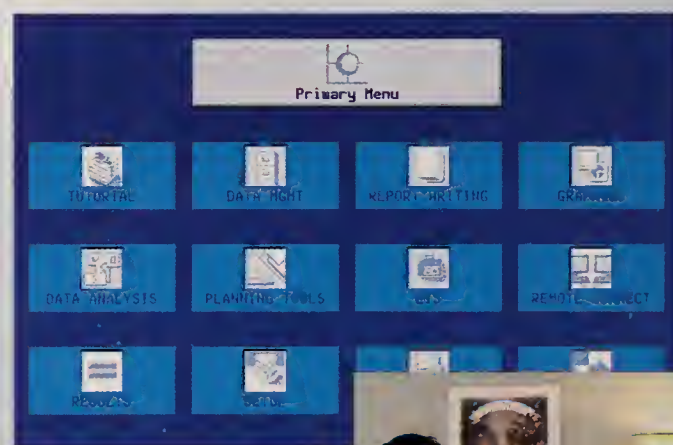
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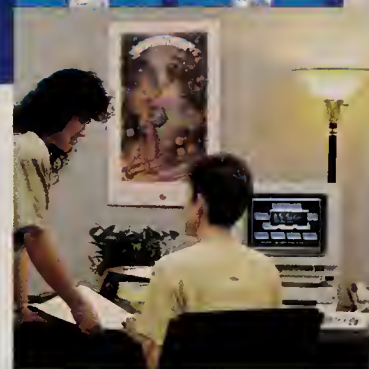
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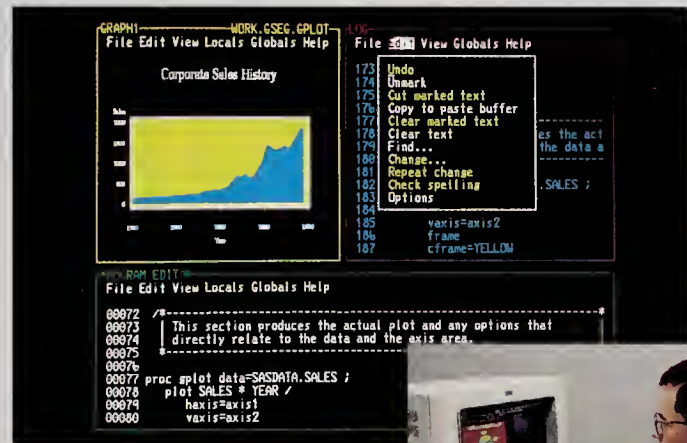
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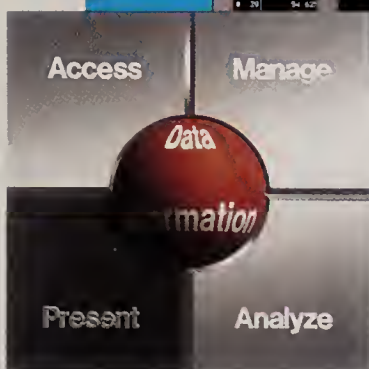
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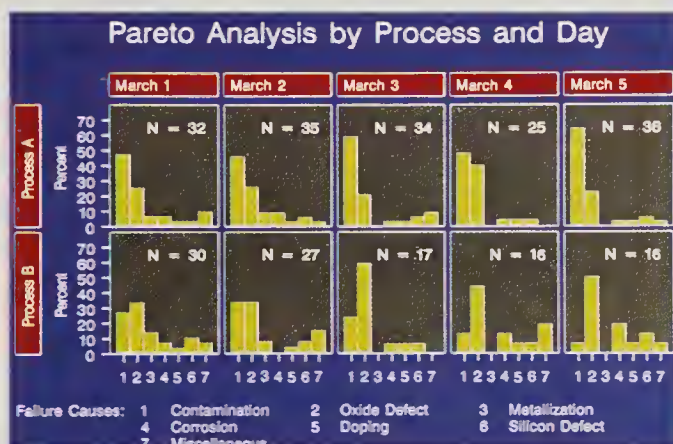
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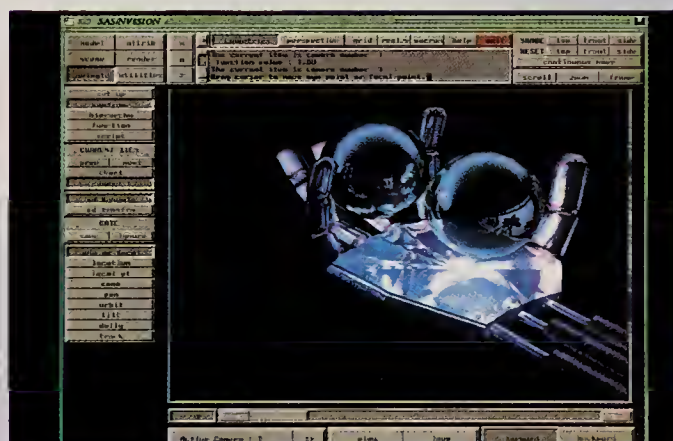
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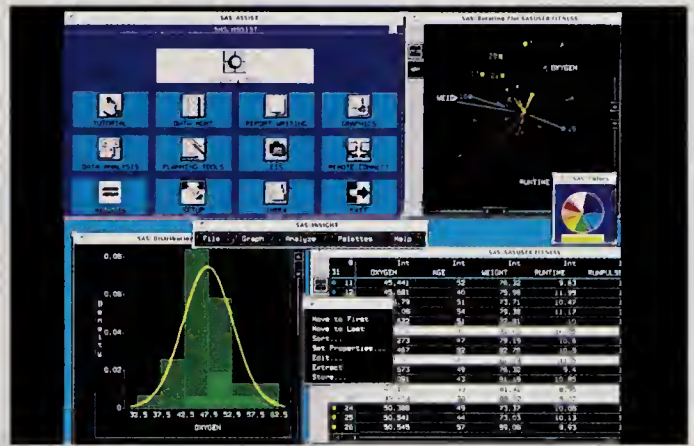
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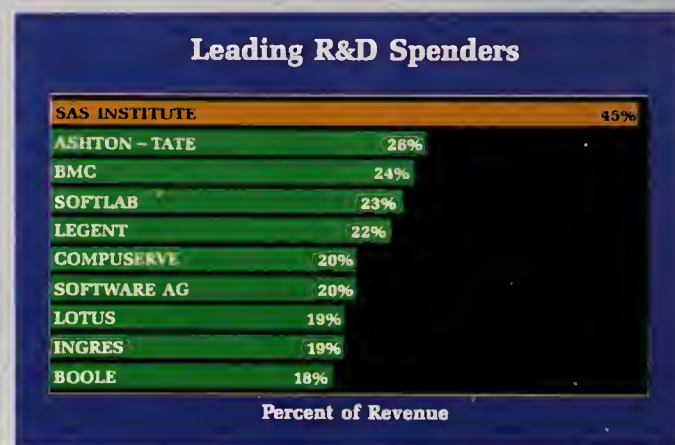
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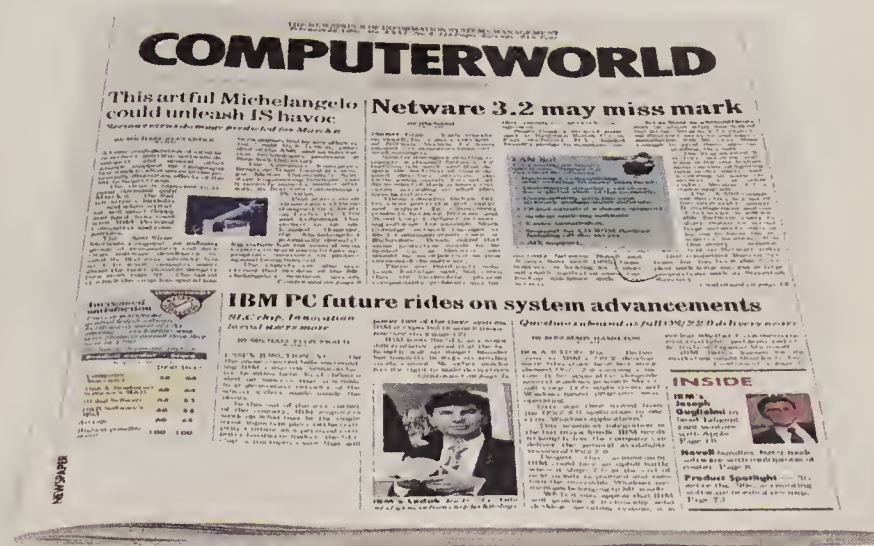
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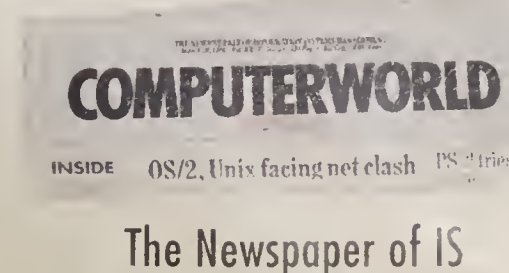


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## COMMENTARY

Jesse Berst

## Start practicing penmanship



Two new pen computing environments are in a launch phase: Windows for Pen Computing and PenPoint. As a result, you're going to be inundated with ads about the

glories of mobile, pen-based computing.

In my last installment, I gave you the bad news about today's pen computing. In brief, the handwriting recognition is still clumsy, the use of ink-like input still has limitations, and the hardware and software are still going through first-generation shakedown.

Fortunately, we're seeing rapid progress on all fronts. Now I'd like to explain why pen computing is a bona fide opportunity for many IS departments, despite its limitations and growing pains.

I think pen technology will eventually transform corporate computing. "It is a technology that even the CEO will use," says Bill Lempesis, president of Lempesis Research, a Pleasanton, Calif.-based firm specializing in the pen computing market. "A CEO seeing a pen-based system for the first time can immediately

think of applications."

That's what sets pen computing apart from vague, vaporous technologies such as multimedia. I've chatted with a dozen or so Pacific Northwest companies that are actively investigating pen computing. In every case, they had specific applications in mind.

Washington Natural Gas, for instance, wants to equip its 100 field salespeople with pen computers. With a clipboard computer and a custom application, they could conduct energy audits and calculations right on the spot at large customer sites. As it stands now, there's a delay while they bring in paper forms to be typed into the office computers.

**Airborne applications**

Boeing is working on a pilot program (no pun intended) for the factory floor. It wants to team pen-equipped clipboard computers with a wireless local-area network to give technicians access to parts inventories. "Our people spend their lives filling out four-part forms, tearing them apart and routing them around," a Boeing employee complains. He says he hopes clipboard computers can set them free for productive work. Incidentally, he claims wireless technology works even inside airplanes.

And you won't be surprised to hear that insurance companies have dozens of applications in mind. The company I interviewed wants to give pen computers to its life insurance salespeople for instant, on-the-spot quotes and to its risk analysis people and its claims adjusters.

Where should you start your investigations of pen computing? I have friends at several competing systems houses who won't be very happy to hear me say this. However, right now the safest place to start is with Windows for Pen Computing.

Testing pen technology with Windows has several advantages. The environment has a wealth of development tools so you can get your prototypes up in a hurry. You'll also be able to leverage your investment by using chunks of code or even entire applications originally written for desktop applications.

Windows for Pen Computing is also safe because you can be sure it will be around for a while. Some of the other environments will survive as well, but right now it's tough to say which ones.

Finally, I like Windows for Pen Computing because it makes for such an easy transition. Pen users can work with the same interface they use on their desktop machines. They can even bring over their favorite desktop applications because virtually any Windows program can use the pen as a mouse.

An easy back-and-forth transition is important because pen computing won't be restricted to mobile systems. Once desktop-bound users see the productivity

advantages of pen-based applications, they will demand them on the desktop.

During the next five years, you'll see pen-enabled platforms in a variety of different forms:

- Strap-on wrist computers.
- Palmtops (daytimer size).
- Clipboard computers.
- Convertible laptops (detachable keyboard).
- Pen pads for desktop machines (like today's digitizer pads).
- Desktops (the surface of your desk is a pen-enabled screen).
- Blackboards.

Don't think this list is nothing more than one of Jesse's science fiction dreams. There are working prototypes for most of these platforms.

I admit that I'm skeptical about multimedia and other overhyped new technologies. But I'm bullish on pens. Provided you move carefully, one step at a time, it's not too early to start practicing your penmanship. Eventually, pens are going to write a whole new chapter in corporate computing.

Berst is the publisher of Redmond, Wash.-based "Windows Watcher" newsletter, a monthly briefing service for software executives and corporate technology managers.

## Symantec revises Norton utilities

BY CHRISTOPHER LINDQUIST  
CW STAFF

CUPERTINO, Calif. — Symantec Corp. has announced a trio of updated and enhanced utilities products for DOS, Microsoft Corp.'s Windows and Apple Computer, Inc.'s Macintosh platforms.

The products — Norton Desktop for Windows Version 2.0, Norton Utilities for Macintosh Version 2.0 and Norton Desktop for DOS Version 1.0 — each incorporate a variety of Symantec's previous utility products into one package.

Norton Desktop for DOS, the only entirely new product of the three, creates a "drag-and-drop" environment under DOS. It works as a DOS shell for such functions as moving, deleting and viewing files, and it also provides an integrated environment for a variety of utilities including Norton Backup, Norton Antivirus and Norton Disk Doctor.

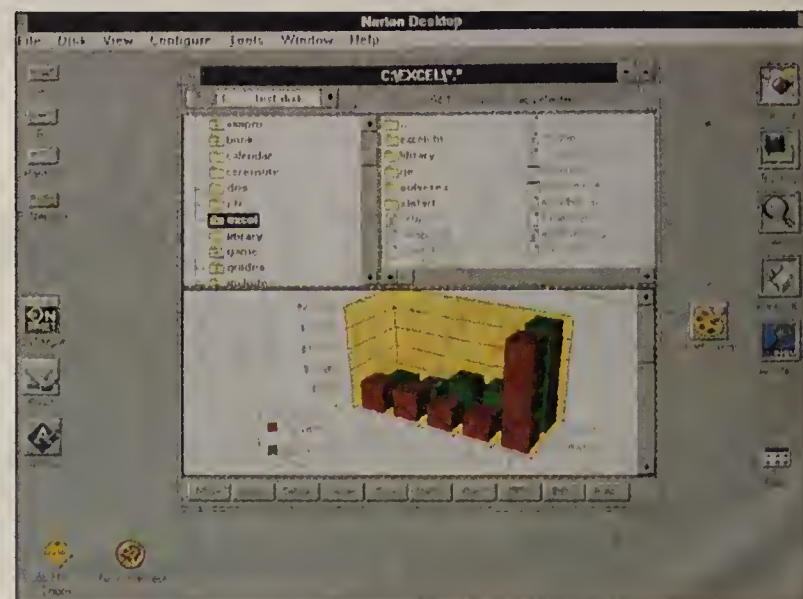
"What Symantec has done is taken the Norton utilities and made a major feature enhancement," said James Ross, assistant vice president for end-user computing at a large bank and a Desktop for DOS beta-test user.

"It's a lot like having Windows," said Bruce Walton, another beta-test user and a computer consultant at Sacramento, Calif.-based California Conservation Corps. Both users indicated, however, that the product was sluggish when switching utilities, particularly on 286-

based systems without any expanded memory.

Symantec's second attempt at Norton Desktop for Windows adds enhancements such as faster performance, virus protection and repair, a Windows-based text editor, an uninstall program and a macro builder to the Windows environment. In addition, Desktop for Windows can now be installed automatically over a variety of networks, including Novell, Inc.'s NetWare and IBM's OS/2 LAN Server.

Version 2.0 of Norton Utilities for

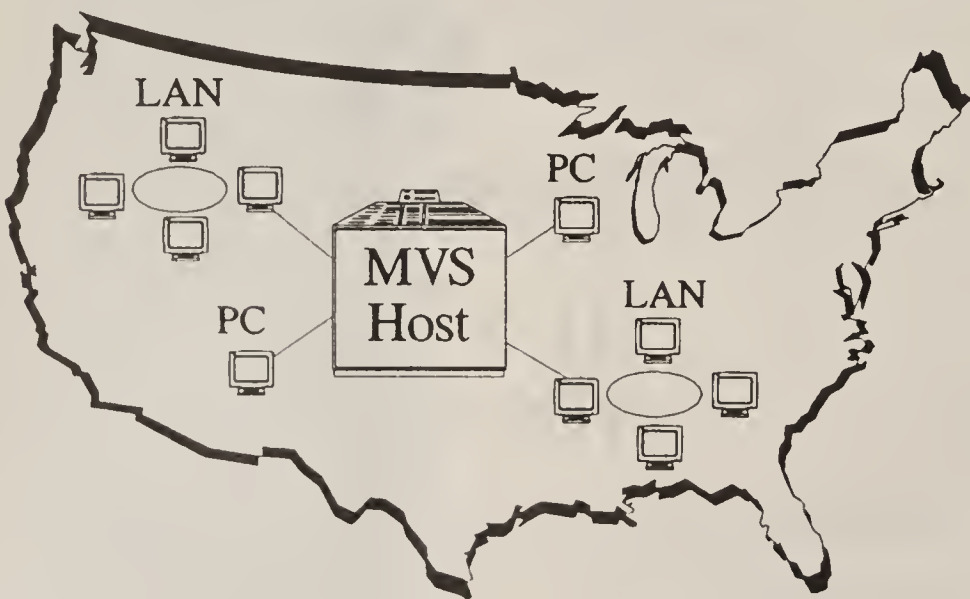


**Norton Desktop for Windows and Norton Utilities for Macintosh cost \$149 each; Norton Desktop for DOS is \$179**

Macintosh combines the features of Symantec Utilities for Macintosh II (SUM) and Norton Utilities for Macintosh into one product. Data recovery and disk copying features have been improved.

All products are currently available. Norton Desktop for DOS has a suggested list price of \$179. Norton Desktop for Windows and Norton Utilities for Macintosh each have a list price of \$149. Registered Desktop for Windows users can upgrade to Version 2.0 for \$49. Utilities for Macintosh and SUM users can upgrade to Version 2.0 for \$39.

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# Desktop tool helps bank see checks and balances

BY CHRISTOPHER LINDQUIST  
CW STAFF

For a bank to track the movement of a check from the point when the customer walks into a branch with it to when it is charged to an account or sent to another financial institution is a complex process.

Multiply that complexity by an average of 1.5 million checks per day, and you have an idea of what the Canadian Imperial Bank of Commerce in Toronto faced when it wanted to analyze its check-handling process to make it more efficient.

At one time, such an analysis would have been done by hand using a stupefying array of formulas and charts. However, the advent of the computer changed that, allowing complex analyses to be done automatically.

When Canadian Imperial decided to go with such a package, it chose Design/IDEF and Design/CPN from Meta Software Corp. in Cambridge, Mass. "Other products were more geared to manufacturing and were not as flexible," said John Bumister, a vice president in the chief information officer's office at Canadian Im-

perial. "The Meta product can be used for anything."

Design/IDEF is a modeling tool that utilizes the Structured Analyst and Design Technique to model activities. This allows users to create a graphical description of a business process or system to be analyzed.

Behavior information is added to the model and then transferred to Design/CPN, which creates a graphical simulation of the system or process using Colored Petri network technology.

## Simple to employ

One important feature of the Meta tools was ease of use. "You don't have to be a rocket scientist to be able to use it," Bumister said. As a result of using the tools, the bank is now able to process 95,000 more checks per day, and each check that is not "floated" saves the bank money.

The project was so successful that the bank now has some 16 additional analysis projects under way, including Visa processing and teller machine processes.

The benefits of such an analysis apply to more than just banking. "In any busi-

ness, if they can understand that business process, they can make improvements," Bumister said.

Design/CPN costs \$20,000 and runs on Unix and Apple Computer, Inc. Macintosh platforms as well as hybrid Macintosh/Unix environments.

Design/IDEF runs on Microsoft Corp. Windows, Macintosh and Unix platforms and costs \$3,995. Both products require a one-year maintenance contract for an additional \$1,000.

## Outshining Windows

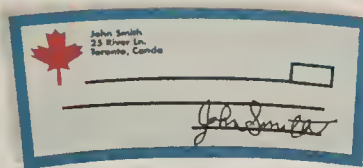
IBM is now solely responsible for the development of OS/2 2.0, which is a 32-bit system requiring a 386 or higher architecture. It leaves 1.X versions and Windows behind in every respect. IBM refers to 2.0 as the Integrating Platform. As such, 2.0 can run DOS, Windows and OS/2 applications concurrently. It also delivers advanced computer functions with drag-and-drop simplicity through a new GUI called Workplace Shell.

Why would a user want to abandon DOS and, possibly, Windows? As DOS applications have advanced, the memory remaining after DOS is loaded is usually very close to what the application requires. This forces users to make temporary changes to their configurations to regain memory. These changes include termination of network services and many of the convenient features of DOS Terminate and Stay Resident (TSR) routines.

Windows users also have their problems with Unrecoverable Application Error, which may not result in loss of data but terminates the application and destroys unsaved work.

OS/2 2.0 addresses these problems by including native support to run DOS, Windows and OS/2 applications. The

## ON SITE



### Canadian Imperial Bank of Commerce Toronto

- **Challenge:** To make its check processing more efficient.
- **Technology:** Uses Meta Software procedure analysis packages to analyze the check process.
- **Results:** Can now process 95,000 more checks per day, reducing costs incurred when checks are held or "floated."

ness, if they can understand that business process, they can make improvements," Bumister said.

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DOS support is first-rate. Device drivers and TSRs can be loaded outside of the 640K-byte memory area; a multitasking high-performance file system provides file I/O for each DOS session; and more memory can be configured for each session than is available for DOS 5.0. You can boot your favorite DOS application in a virtual DOS machine, you can support several memory extenders, and you can even configure for more memory than is physically available.

OS/2 2.0 even does Windows. Multiple Windows applications can run concurrently. More importantly, total system performance of OS/2 is excellent when you consider the speed of applications running in the background.

With robust DOS and Windows support, OS/2 has one attractive feature that DOS and Windows do not. It protects the applications from each other so the user doesn't have to worry about losing everything because one application crashed the system. Another benefit to using OS/2 for DOS and Windows applications is that the Workplace Shell GUI is only available with OS/2.

While the new OS/2 may be a better DOS than DOS in many areas, as well as a better Windows environment, IBM has its work cut out if OS/2 is to be the desktop operating system of choice. OS/2 has not received favorable press in the past, and the split from Microsoft has thrown both companies for a loop.

IBM has learned much regarding the real (read non-Blue) world during the past year or so. It has beta-tested OS/2 with 30,000 users and will provide support for OEM machines with OS/2 2.0. This gives it a huge marketplace in which to sell OS/2. Regardless of where Microsoft is heading with Windows, IBM has an excellent opportunity with OS/2 2.0.

Albert is president of Sam Albert Associates in Scarsdale, N.Y.

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- 8:00 Welcome/Registration
- 8:30 Implementing Client/Server:  
Gortner Group Presentation
- 9:15 Enterprise-Wide Computing:  
Desktop to Data Center
- 10:30 Break
- 10:45 SUPRA Demonstration
- 11:30 True-Life Success Story
- 11:50 Questions and Answers

## COMMENTARY

Sam Albert

### Future bright for OS/2 2.0



Today's big battle in the desktop arena is IBM vs. Microsoft for the operating system standard. Why should users care? Because the operating system will define the standards for the next generation of applications and LANs.

IBM has stood firm behind OS/2. Microsoft, on the other hand, abandoned OS/2 in favor of Windows.

Microsoft delivered DOS to IBM in 1981 as the operating system for IBM's first PC. It was based on CP/M and was similar in the function it provided. During the past 10 years, DOS has been revised many times, mainly to support new hardware.

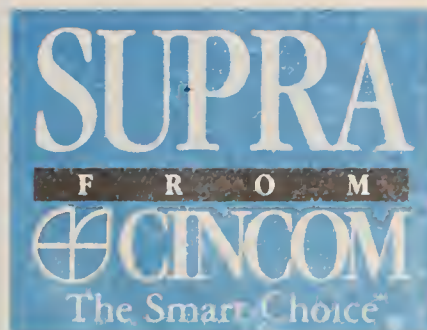
The reason for Windows' popularity is simple. It has a single requirement for a PC: DOS must be installed. Anybody with a PC and DOS can get it at little cost, get it installed with minimal fuss and be playing solitaire in 20 minutes or so.

Why not settle on Windows as the desktop operating environment for the 1990s? Well, once you get past the glitz, the games and the large application base, you get back to the root of the problem, which is DOS. DOS was not designed to handle multiple applications running concurrently; it was not designed to maintain networks and host communications; and, most importantly, it was not designed to protect the applications and the data they work on.

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Baltimore	4/28	Parsippany, NJ	5/7
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## IN BRIEF

Software  
suit settled

■ Details of a settlement between **The Software Publishers Association (SPA)** and **Advanced Business Microsystems, Inc. (ABM)** are being worked out and will include an undisclosed monetary contribution to SPA from ABM. ABM was sued by the SPA on behalf of several leading micro-computer software vendors for operating unlicensed copies of their software. It has also agreed to establish companywide policies aimed at preventing unauthorized software copying.

■ **Go Corp.** signed a deal with **ParaGraph International**, a Russian-American business venture. The two companies will integrate ParaGraph's cursive handwriting-recognition product, **CalliGrapher**, into **PenPoint**, the pen-based operating system from Go. The agreement also calls for Go to distribute **CalliGrapher**.

■ **Software Publishing Corp.** started a Superbase Partners Program to provide information and training to software developers who write applications for its relational database management system.

■ **Apple Computer, Inc.** is offering a free protective case for battery packs that work with its Powerbook series of portable computers. Exposed battery packs can be short-circuited if they come in contact with metal objects, such as paper clips or keys. The protective case can be ordered through Apple. All Powerbook rechargeable batteries sold after May will be shipped with the protective case.

■ **Apple** also announced a program to recycle used toner cartridges from its laser printers. The Apple Clean Earth Program will be rolled out on a country-by-country basis; it began in the U.S. last week. Customers will soon be receiving toner cartridges with a prepaid shipping label to be used to return the cartridges to Apple or Apple resellers.

## Plethora of products debut at Comdex

*Hardware vendors focus on upgradables, multimedia; software offerings target OS/2, Windows*

## HARDWARE

► **The NCR Corp.** System 3330 is an upgradable desktop system based on the AT/XT architecture. The base configuration includes an Intel Corp. 25-MHz I486SX microprocessor; a more powerful chip can be plugged directly into the motherboard. Other features are integrated 256-color Super VGA video with 1M byte of video memory, an integrated hard drive controller and four expansion slots. The systems will be available in May, with prices starting under \$3,000. Another introduction from NCR is the System 3320, an upgradable Micro Channel Architecture desktop system with an Intel 20-MHz I386SX processor. Starting price for the 3320 will be less than \$1,900. *NCR, 1700 S. Patterson Dr., Dayton, Ohio 45479. (513) 445-5000.*

► **Data General Corp.** announced the Dasher II-486SX/20A chip-upgradable system. The small-footprint personal computer includes a built-in disk drive, video controllers and four 16-bit expansion slots. Pricing starts at \$2,545 including MS-DOS 5.0, Windows 3.0 and several software utility packages. DG also unveiled the full-size Dasher II-386/33L, which features 4M bytes of random-access memory and eight expansion slots. Pricing starts at \$2,445 including the same software bundle. *Data General, 3400 Computer Drive, Westboro, Mass. 01580. (508) 366-8911.*

► **Unisys Corp.** expanded its Personal Workstation<sup>2</sup> line of desktop systems with the PW<sup>2</sup> Advantage Series 3162, based on the Intel 16-MHz 386SX processor. The PC includes from 1M to 5M bytes of RAM. A model with one floppy drive, a 40M-byte hard drive and integrated Super VGA lists for \$1,495. Available with the systems is a \$225 software bundle including MS-DOS 5.0 and Windows 3.1. *Unisys, Township Line and Union Meeting Roads, Blue Bell, Pa. 19424. (215) 986-2989.*

► **AMKLY Systems, Inc.**'s newest models are based on the Intel 486DX2 microprocessor. The AT/XT bus-based AMKLY 486DX2/50 (\$2,795) and the Extended Industry Standard Architecture AMKLY 486DX2/50E (\$3,995) each offer integrated Super VGA capability and bundled MS-DOS 5.0. *AMKLY Systems, Suite 104, 275 Centennial Way, Tustin, Calif. 92680. (714) 730-4774.*

► **Tandy Corp.**'s Radio Shack retail group introduced a notebook computer based on the power-saving Intel 25-MHz 80386SL processor. The Tandy 3830 SL (\$2,999) includes a minitrackball, 80M-byte hard drive and backlit Video Graphics Array (VGA) display. A docking station option with two expansion slots is available. Tandy also showed new desktop multimedia-capable PCs, including an enhanced video graphics chip that simultaneously displays up to 16 million colors. The systems (starting at \$1,999) provide a compact disc/read-only memory (CD-ROM) player and an audio adapter. *Tandy/Radio Shack Division, 700 One Tandy Center, Fort Worth, Texas 76102. (817) 390-3011.*

► **DAK Industries, Inc.** announced a front-loading, caddyless CD-ROM drive priced at \$199. The BSR CD-ROM drive comes with an interface card, cables and software drivers. It also includes program-mable launchers for CD-ROM applications and music CDs. *DAK Industries, 8200 Remmert Ave., Canoga Park, Calif. 91304. (818) 716-6219.*

► The Video Blaster was introduced by **Creative Labs, Inc.** The \$495 board, scheduled to ship in the second quarter, displays full-motion video output on a PC screen. Users can combine NTSC or PAL video with computer-generated graphics, the company said. The Video Blaster also performs screen captures that can be stored in bit-map, Tag Image File Format, encapsulated PostScript and other formats. The product is Windows 3.1-compatible and requires VGA display. *Creative Labs, 1901 McCarthy Blvd., Milpitas, Calif. 95035. (408) 428-6600.*

► **Proxim, Inc.** announced RangeLAN/LT, a wireless local-area network adapter card for Compaq Computer Corp. notebook computers. The credit card-size adapter plugs into the fax/modem slot in Compaq LTE 386S/20 and LTE Lite systems; support is included for Novell, Inc.'s NetWare and Artisoft's LANtastic. The price for RangeLAN/LT is \$595. *Proxim, 295 N. Bernardo Ave., Mountain View, Calif. 94043. (415) 960-1630.*

## SOFTWARE

► **Impromptu Release 1.1**, a Windows-based SQL query tool from **Cognos, Inc.**, allows users to extract data from a corporate database and save and query the data on local PCs. The upgrade also adds support for Sybase, Inc.'s SQL Server and Microsoft Corp.'s OS/2-based SQL Server. The product costs \$695 with midsummer availability planned. *Cognos, 67 S. Bedford St., Burlington, Mass. 01803. (617) 229-6600.*

► **Simpact Associates, Inc.** displayed Remark for Microsoft Windows, a product that lets users record voice annotations and attach them to a Windows application that supports Dynamic Data Exchange or Object Linking and Embedding (OLE). Remark users can store a voice annotation along with an electronic document and pass it across a LAN. The product integrates a LAN-based voice server and the standard telephone system, so PC users on the LAN can access Remark voice information without using PC sound boards. Remark is available now with prices ranging from \$5,500 to \$20,000. *Simpact Associates, 9210 Sky Park Court, San Diego, Calif. 92123. (619) 565-1865.*

► A new release of **NBI, Inc.**'s Legacy word processing software package includes beefed-up support for Windows. Version 2.1 of Legacy supports Windows 3.1 and Microsoft's OLE technology. It also has drag-and-drop file management, standard dialog boxes and a new icon bar that users can customize. Priced at \$495, the product is slated for June 15 delivery. *NBI, 3450 Mitchell Lane, Boulder, Colo. 80301. (303) 444-5710.*

► **ICOT Corp.** introduced OmniPATH for Windows, an IBM 3270 terminal emulation package. OmniPATH configures itself for the hardware it is installed on and features a point-and-click, PC-to-host connection. It uses Windows' Multiple Document Interface to handle up to 26 concurrent sessions to multiple hosts. Prices range from \$395 for one user to \$2,995 per gateway license. *ICOT, 3801 Zanker Road, San Jose, Calif. 95150. (408) 433-3300.*

► **NetManage, Inc.** set up shop in the Microsoft booth to demonstrate ChameleonNT, a Transmission Control Protocol/Internet Protocol applications package running under Windows New Technology. The ChameleonNT package includes Telnet terminal emulation and file transfer programs, diagnostic tools and an object-oriented Simple Mail Transfer Protocol electronic-mail program. *NetManage, 20823 Stevens Creek Blvd. #100, Cupertino, Calif. 95014. (408) 973-7171.*

► Every pen-based system from **Momenta International** will include bundled Alien Computing Corp. FAXit for Windows software, Momenta announced. Momenta systems include a built-in fax and data modem. *Momenta, 295 N. Bernardo Ave., Mountain View, Calif. 94043. (415) 969-3876.*

► **Banyan Systems, Inc.** announced OS/2 2.0 client support for its Vines network operating system. General availability is planned for the second half of 1992. *Banyan, 120 Flanders Road, Westboro, Mass. 01581. (508) 898-1000.*

► **Easel Corp.** also plans to support OS/2 2.0 in the Easel Workbench client/server application development tool kit. The Workbench will sport a Common User Access-compliant interface. *Easel, 25 Corporate Drive, Burlington, Mass. 01803. (617) 221-2100.*

► **Autodesk, Inc.** will support Microsoft's Windows NT operating system in a future release of AutoCAD computer-aided design software. Autodesk also showed off a set of new Windows 3.0/3.1 products: AutoSketch for Windows (\$299) is a technical illustration package; Multimedia Explorer (\$199) is an entry-level animation product; and HyperChem (\$3,500) is a molecular modeling tool. *Autodesk, 2320 Marinship Way, Sausalito, Calif. 94965. (415) 332-2344.*

► **Software Publishing Corp.** announced that its Harvard Graphics for Windows software is fully compatible with Windows 3.1. According to the company, the Windows 3.1 Help file incorrectly listed Harvard Graphics as an incompatible product. *Software Publishing, 3165 Kifer Road, Santa Clara, Calif. 95056. (408) 936-8000.*

*Information compiled by Derek Slater, Computerworld's new products writer.*



## NEW PRODUCTS

**Software applications packages**

Aldus Corp. has begun shipping Aldus FreeHand 3.1 for Windows.

The updated illustration software supports input from pressure-sensitive drawing tablets.

It also works under Microsoft Corp.'s Windows 3.1 and includes enhanced editing tools and layer handling.

The price is \$595.

**Aldus**  
411 First Ave. South  
Seattle, Wash. 98104  
(206) 622-5500

Autodesk, Inc.'s AutoCAD Release 11 is now available on Hewlett-Packard Co.'s HP Apollo 9000 Series 700 workstations.

The computer-aided design software is compatible across all supported platforms. Pricing on the HP workstations is \$3,500.

**Autodesk**  
2320 Marinship Way  
Sausalito, Calif. 94965  
(415) 332-2344

**Systems**

Dataram Corp. has announced memory expansion boards for Hewlett-Packard Co.'s HP Apollo 9000 Model 705 and 710

workstations.

The boards come in capacities of 8M, 16M and 32M bytes. Prices are \$1,400, \$2,800 and \$5,600, respectively.

**Dataram**  
Route 571, Princeton Road  
West Windsor Township, N.J.  
08543  
(609) 799-0071

Austin Computer Systems has announced shipment of the Austin 386/33U WinStation upgradable personal computer.

The PC can be upgraded by replacing just the microprocessor, according to the company. It is bundled with Microsoft Corp.'s MS-DOS 5.0 and Windows software.

A system with 4M bytes of memory, a

200M-byte hard drive, two floppy drives and a color Video Graphics Array monitor costs \$2,445.

**Austin Computer Systems**  
10300 Metric Blvd.  
Austin, Texas 78758  
(512) 339-3500

**Software utilities**

Axcelis, Inc. has created Evolver, an add-in equation solving tool for Microsoft Corp.'s Excel spreadsheet.

Evolver determines the optimal method for solving unique problems and allows users to solve and optimize models with linear, nonlinear, table-based and random functions.

An introductory price of \$295 is offered until June 27. The regular price is \$345; a five-license package costs \$995.

**Axcelis**  
4668 Eastern Ave. North  
Seattle, Wash. 98103  
(206) 632-0885

**Peripherals**

**Relax Technology's Sierra MO** features an average seek time of 33 msec

Relax Technology, Inc. has released a new rewritable optical disc drive, the Sierra MO.

The drive offers 120M-byte capacity in 3½-in. disk form factor. It is Small Computer Systems Interface-compatible and features 33-msec. average seek time. Its sustained data transfer rate is 640K byte/sec.

The Sierra MO drive costs \$1,399.

**Relax Technology**  
3101 Whipple Road  
Union City, Calif. 94587  
(510) 471-6112

Tatung Science & Technology, Inc. now offers high-resolution color monitors for its Scalable Processor Architecture workstations.

The new displays are available in 17- and 19-in. sizes with 1,280- by 1,024-pixel resolution.

Pricing is set at \$2,495 and \$3,295. The monitors are offered only as part of a turnkey solution, according to the company.

**Tatung Science & Technology**  
2060 Ringwood Ave.  
San Jose, Calif. 95131  
(408) 435-0140

Integrax, Inc. has created a 32-bit, 16-in. flat panel display system for Scalable Processor Architecture workstations.

The Integrax Flat Panel Subsystem is 3½-in. deep and has 1,280- by 1,024-pixel resolution.

The \$5,500 price includes a 32-bit Sbus graphics controller card. The card is available separately for \$1,250.

**Integrax**  
Suite 150, 1200 Lawrence Drive  
Newbury, Calif. 91320  
(805) 375-1055

# How to avoid dumb- sizing.

*There are two very different ways to downsize applications from the large, expensive mainframe into the much more cost-efficient open systems environment. You can dumbsize. Or you can SmartSize.*

Downsizing,  
Rightsizing,  
or  
SmartSizing?

*SmartSizers are using UniKix software from Integrax to move CICS applications down to UNIX\* systems and to realize a savings of as much as 6:1. With UniKix there's no need to re-train programmers or network personnel to work with the more powerful tools available in UNIX, so the savings start immediately.*

*Avoid dumb sizing. Call the toll free number below for a free copy of our "Downsizing, Rightsizing, or SmartSizing?" white paper. It's a smart move.*

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INTEGRATED INFORMATION SOLUTIONS  
1-800-765-2826

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SOFTWARE PUBLISHERS ASSOCIATION

# White Paper

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SOFTWARE PIRACY





TOM ZIMMEROFF

**Dear readers:**

Software piracy is a critical problem in the computer industry. It's estimated that last year illegal software copying cost companies over \$10 billion worldwide—vital funds that would go a long way toward keeping the industry healthy and innovative.

Ultimately, software piracy hurts everyone. For one thing, developers lose money that they could use to improve products, documentation, and support for their customers. And whenever developers can't afford to invest in new ventures and markets, innovation and product availability are hindered.

When you buy legal software, you receive more than floppy disks and manuals—your purchase is a vote. It's your way of rewarding the hardworking team that created the great software. And it's your way of enabling them to produce even better products in the future.

Apple is a strong supporter of the computer industry's efforts to fight software piracy. We've donated time, money and resources to industry groups to help solve this problem. We've also been working hard to educate our employees and customers on the legal use of software. Our most recent efforts include several joint projects with the Software Publishers Association and the Business Software Alliance. And we're extremely pleased to be a sponsor of this SPA white paper on software piracy.

We want to make sure our customers always have access to the best software products in the industry. Software piracy threatens productive and innovative developers, and Apple wants to take an aggressive approach in addressing this problem—because stronger software developers mean better software for everyone.

A handwritten signature in dark ink, reading "John Sculley".

John Sculley  
*Chairman of the Board*  
*Chief Executive Officer*

Apple Computer, Inc.  
20525 Mariani Avenue  
Cupertino, California 95014  
(408) 996-1010



### Introduction

Software piracy is a topic that makes lots of people uncomfortable. It makes them uncomfortable because they know if they address the topic honestly, they will end up looking bad. The fact is, they may end up confronting the spectre of their own criminality. Imagine that.

And while you're imagining that, imagine a posse of U.S. marshals knocking on your door and coming in to take a look around. Imagine what might happen to you and your company if they found out you were a software pirate. Imagine fines as high as \$100,000 per copyright infringement. It's not a very pleasant fantasy.

Is this awful scenario the kind of thing that only happens to someone else? Don't count on it. The Software Publishers Association (SPA) and many software vendors are taking to the streets with a vengeance to bring down the pirates they feel are picking their pockets. It could happen to you.

But, you say, making illegitimate copies of simple software programs just doesn't seem wrong, any more wrong than using an office copier machine. What it seems is easy. And how could anything so easy, so inviting, be wrong? It might be tempting to think about the situation in such simplistic terms, but the reality is also easy to grasp: you break the law and you pay.

Clearly the time has come to think differently about software piracy, to think about it in terms of morality, not legality. Would you steal a software program out of a retail store? Of course not. You wouldn't even think about it. So what makes it any more right to make an illegal copy? Once you have the facts, there is no way you should ever "steal" another software program.

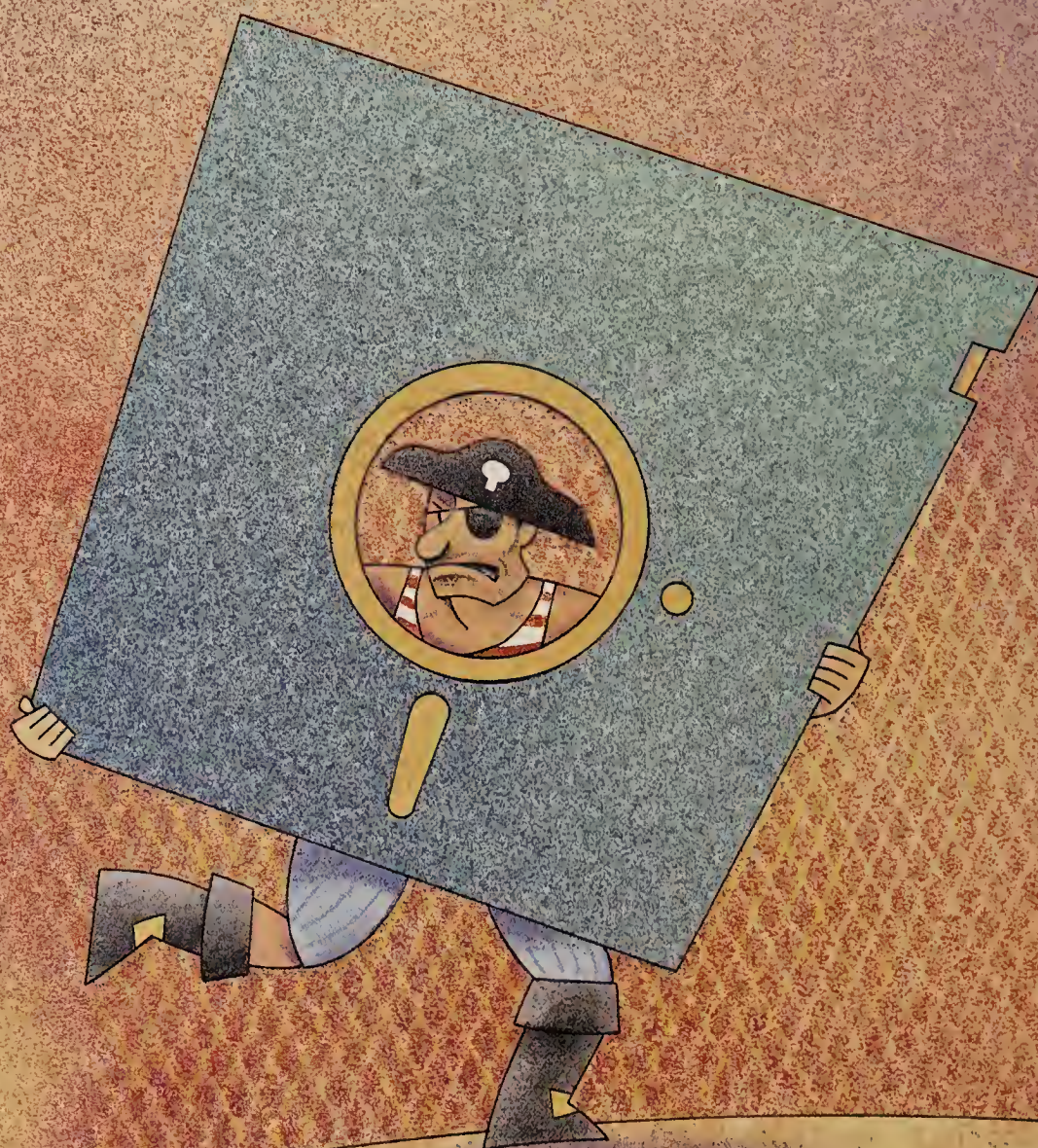
Once the world wakes up to the reality of software piracy, it can adapt itself to it just like it would to any other important issue. In the business world, that means formulating a company-wide software acquisition policy and making sure all employees are aware of it. In the world of private users, it means just doing the right thing.

This White Paper was written independently of the *Computerworld* editorial department by the Software Publishers Association. For more information on the content of this White Paper or for information on the Software Publishers Association, please call (202) 452-1600. For more information on the White Paper Program, please call 508-879-0700.



## SPA White Paper

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# SOFTWARE PIRACY

THE ELECTRONICS MANUFACTURING FIRM'S CHIEF FINANCIAL OFFICER WAS HAVING A NORMAL DAY AT WORK UNTIL THE MID-MORNING FEDERAL EXPRESS DELIVERY. AT THAT POINT, THE COMPANY PRESIDENT APPEARED IN HER OFFICE WITH A LETTER THAT BEGAN AS FOLLOWS: ■ "I AM WRITING ON BEHALF OF THE SOFTWARE PUBLISHERS

ASSOCIATION (SPA), WHICH IS THE PRINCIPAL TRADE GROUP OF THE PC SOFTWARE INDUSTRY. OUR MORE THAN 900 MEMBERS COUNT ON US TO HELP STOP THE UNAUTHORIZED DUPLICATION OF THEIR PRODUCTS. ■ "WE HAVE RECEIVED INFORMATION THAT YOUR ORGANIZATION MAY BE MAKING AND USING UNAUTHORIZED

COPIES OF OUR MEMBERS' SOFTWARE IN VIOLATION OF FEDERAL COPYRIGHT LAW. FROM THE INFORMATION WE HAVE OBTAINED, THE SOFTWARE INVOLVED IS PUBLISHED BY AUTODESK, INC., FIFTH GENERATION SYSTEMS, INC., LOTUS DEVELOPMENT CORP., MICROSOFT CORP., SYMANTEC CORP., AND WORDPERFECT CORP." ■ THE



## SPA White Paper

CFO read the rest of the letter. It suggested that the company submit to a voluntary audit of its personal computers under the supervision of an SPA representative; that the printouts of the PC directories be compared with purchase records; that any unauthorized software be destroyed and replaced with authorized software; and that the company pay the SPA Copyright Protection Fund an amount equal to the retail price of any unauthorized software found. Thereafter, the SPA would release the company from liability from the infringement discovered.

Enclosed with the letter were several articles about the SPA. From these, the CFO learned that the SPA was serious about fighting piracy. She also learned that those organizations that chose not to comply with the SPA were likely to be sued by them. Statutory damages could be as high as \$100,000 per copyright.

"Do we have a written company software policy?" she asked the president.

"No," he replied.

"Have employees ever been told not to make copies of software?"

"I don't know, I've never thought about it."

He never thought about it. Now, his

company will not only think about establishing a written software policy, but it will pay a penalty for past software copyright infringements.

Scenarios like the one described have been repeated with increasing frequency over the past few years. Many industries suffer from theft, whether from counterfeiting, shoplifting, or default on receivables. However, the software industry is more vulnerable than most because of one key distinction. It's the only industry that empowers its customers to become a manufacturing subsidiary of its products. The nature of software is that every end user with a PC on his desktop has all the equipment necessary to make an exact replica of a software program. And the irony is that the easier it becomes to use PCs and software, the easier it is to pirate software programs.

### MAINTAINING YOUR SOFTWARE AS A CORPORATE ASSET

There is an inherent difficulty in managing software as a corporate asset. Copying software is easy to do and so difficult to control. Often piracy is unintentional and can be attributed to ignorance on the part of end-users. Because

copying software is so easy and because license agreements can be confusing, many people don't realize that they are breaking the law.

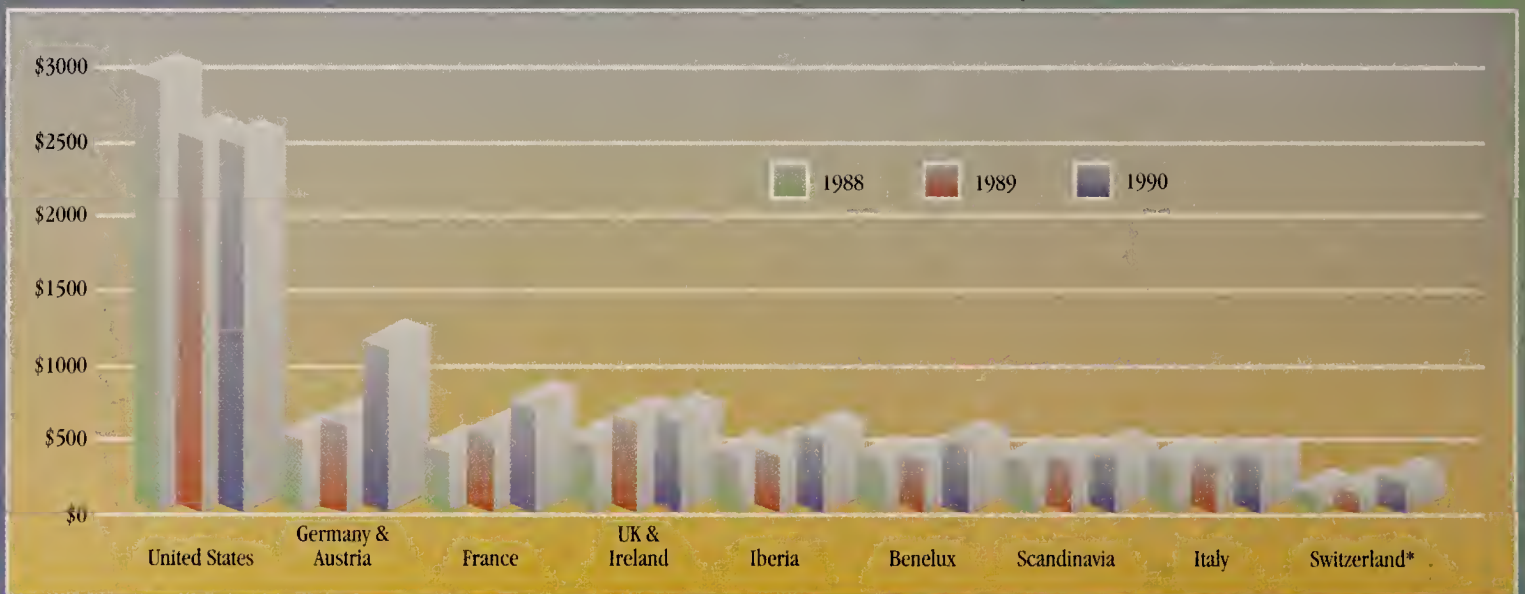
However, the copyright law itself is not confusing. The law, which governs the use of commercial software, is very straightforward. It is illegal to make a copy of a piece of software for any reason other than as a back-up without the permission of the copyright holder. Companies and individuals who break this law can be liable for as much as \$100,000 for every instance of software copyright violation.

### LOSSES IN THE BILLIONS

In 1990, the software industry, with annual U.S. revenues of \$4 billion, lost \$2.4 billion in the U.S. from piracy. Worldwide loss estimates are between \$10 and \$12 billion. Piracy not only hurts the software industry, but the U.S. economy as well. During the past 10 years, the U.S. software industry has become an important national resource. Approximately 80% of the software used in the world today is developed in the United States.

By depriving the software industry of billions of dollars in revenue, software pi-

SOFTWARE REVENUE LOST TO PIRACY BY COUNTRY  
(1988-1990)



\*Switzerland figures for 1988 and 1989 are estimated. Totals may not add due to rounding.

SOURCES: SPA Publishers International Sales Report, International Data Corp. and DataQuest.

Revenue loss is estimated by multiplying the shortfall between the actual and expected software units purchased per PC, by the number of PCs sold, by the average price of a business software package, by year, by country.



## Software Piracy

rates jeopardize U.S. leadership in an important high-tech market by slowing down the development of new products. At a time when many claim the U.S. is losing its competitive edge in technology, it is critical to recognize the role the software industry plays in maintaining the U.S. position in the global marketplace.

The corporate workplace is unquestionably the most prevalent software theft environment. As a result, the SPA, a trade group composed of software publishers, has made it a top priority to work with corporate America to stop the spread of software piracy. The SPA is well known for its two-pronged approach to piracy.

One approach is an active litigation program against companies and individuals who are engaged in software piracy. In the last three years, the group has filed over 100 lawsuits against dealers, corporations, hard disk loaders and bulletin board operators. Many of these have resulted in significant settlements, some over \$300,000. The SPA's activities have made businesses across America aware that software piracy is not a crime that goes unnoticed. Its other approach is one of public awareness. Through educational materials and speeches, the SPA strives to educate computer users about the copyright law and how to effectively manage their software resources.

### GETTING LEGAL

It's clear that piracy lawsuits and audits are causing companies to give more serious thought to the software practices of their employees. The only way for a company to avoid the risk of expensive and embarrassing litigation is by educating employees about the copyright law, rigorously enforcing anti-piracy programs, and conducting periodic audits. The materials in this White Paper are designed to further explain the extent of the problem, and how IS professionals can be enlisted in the fight against software piracy.

### DON'T COPY THAT FLOPPY

Many businesses don't think software

### BUSINESS SOFTWARE UNITS SOLD PER CPU, BY REGION

	1988	1989	1990	% Legal
Germany/Austria	.61	.72	.73	23.6%
France	.65	.66	.82	25.4%
Italy	.17	.34	.55	17.8%
Scandinavia	.58	.81	1.04	33.2%
Benelux	.53	.58	.64	20.8%
Iberia	.07	.17	.29	9.5%
Switzerland	N/A	N/A	.43	13.2%
United Kingdom & Ireland	.75	.84	1.05	34.1%

SOURCES: SPA Publishers International Sales Report, International Data Corp. and Dataquest

piracy is a serious problem. The management of Davy McKee Corporation, a construction engineering firm headquartered in Pittsburgh, learned the hard way. Just before Thanksgiving 1990, Davy McKee's Chicago office received a surprise visit from representatives of the SPA accompanied by U.S. marshals.

After meeting with the firm's executive management, the audit team went into action, searching the hard disks of their computers for unauthorized copies of software. Following this, the court required Davy McKee to perform an audit of all PCs in each of the company's five locations. Davy McKee ultimately agreed to a settlement of \$300,000. The agreement also required the firm to destroy all unauthorized copies of software, replace them with legitimate products, and to institute formal internal copy control procedures at each location.

Managers at Davy McKee, like many others, didn't think about the fact that software piracy is against the law, nor did they consider the exposure of their company with every unauthorized copy of software. But the software industry is fighting back, and corporate America is learning to take the software copyright

laws as seriously as the myriad of others for which non-compliance can put their organizations at serious financial risk.

The fact remains, however, that every computer user has all the equipment necessary to make a perfect copy of a software product. The software industry's challenge is to convince users that the ease of duplication does not justify the theft of the product.

Many employees are often confused about what is expected of them when it comes to software use. Often companies do not articulate a clear software policy. Sometimes employees are given mixed signals, as in the case when they're told not to pirate software, but they're required to complete a computing task without the necessary software tools to accomplish the job. But the law itself is not confusing. Federal law states that it is illegal to make unauthorized

copies of software except for archival or back-up purposes. Companies and individuals who break this law can be liable for as much as \$100,000 for every instance of software copyright violation.

### THE SCENE OF THE CRIME

More than half of the revenues lost from piracy are a result of "softlifting," a crime often committed by otherwise law-abiding employees who make copies of software to use in the office or to take home. It's ironic that people who would never think about stealing a candy bar from a drug store seem to have no qualms about copying a \$500 software package. The scene of the crime is not only corporations, but schools, non-profit organizations, government agencies and even law enforcement agencies.

Arguably, an entire computer platform has been lost to software piracy. In 1985, the Atari ST became so identified as a pirate's machine that software developers refused to write programs for it, and it has all but disappeared from the market. And the consumer lost a low-priced computing option.

Often overlooked in assessment of piracy is the cost to the user himself.



## SPA White Paper

### A SAMPLING OF TYPES OF INSTITUTIONS SUED BY THE SPA

Producer of accounting software  
CALIFORNIA

Software reseller for auto dealers  
PENNSYLVANIA

Architectural firm  
NEW YORK

Computer dealer  
CALIFORNIA

Women's clothing retailer  
NORTH CAROLINA

Office products retailer  
NEW YORK

Commodities dealer  
NEW JERSEY

Training school  
CANADA

Computer consultants to government  
VIRGINIA

Computer dealer  
CALIFORNIA

Computer hardware and software retailer  
CALIFORNIA

Mail order catalog of consumer goods  
MINNESOTA

Engineering firm  
ILLINOIS

Airport management company  
NEBRASKA

Environmental consulting firm  
TEXAS

Book publisher  
NEW YORK

Financial planning/consultants  
FLORIDA

Paint manufacturer  
CALIFORNIA

Computer manufacturer  
MASSACHUSETTS

Sports management company  
ILLINOIS

Mortgage company  
MINNESOTA

Computer dealer  
CALIFORNIA

Construction management firm  
NEW YORK

Underwriting company  
FLORIDA

Government contractor  
OHIO

Health benefits management firm  
NEW YORK

Training school  
CALIFORNIA

Engineering and consulting firm  
WASHINGTON

Government contractor  
CALIFORNIA

Mail order catalog/rental firm  
CALIFORNIA

Defense contractors  
CALIFORNIA

SOURCE: SPA

When users copy software, they miss out on many of the valuable benefits of owning authorized software. These include a variety of user manuals and tutorials, customer telephone support and notification of, and information about, upgrades. Services like these are crucial to the value of the software product. They also increase the price of the product for all legitimate purchases.

### HOW THE SPA TAKES AIM AT PIRATES

Over the past three years, the SPA has collected more than \$3 million in penalties from software pirates and generated a substantial amount of new sales for the software industry as a whole. Recoveries from settlements are used to fund future litigation as well as anti-piracy educational efforts.

The SPA targets pirates based on tips received from a variety of sources, primarily its anti-piracy hotline (800-388-7478). Approximately 30 calls a day are received from temporary, former, or even disgruntled employees. Interestingly, the SPA's first three raids in New York City on three separate organizations were based on evidence provided by a single temporary worker.

While the SPA has filed lawsuits against more than 100 companies, it receives many more reports that do not lead to legal action. Many of these are resolved with a cease-and-desist letter. Addressed to the president of the company, the cease-and-desist letter identifies the software the company is suspected of pirating and warns the company to cease and desist illegal software usage.

For more serious offenders, the SPA requests an audit, which is another alternative to litigation and, therefore, a strategy preferred by many companies. During the voluntary audit process, an SPA representative observes as the file directories of each PC in the company are printed and compared with purchase records. Before this procedure, the company agrees to pay to the SPA the retail price of all unauthorized software found during the audit. It also agrees to destroy the illegal copies and repurchase all software that is necessary for the company to operate legally.

In cases the SPA believes are appropriate for litigation, it will often obtain a search and seizure order from the court.

This order empowers representatives of the SPA, accompanied by U.S. marshals, to enter the premises of an organization and conduct a surprise audit of the company's PCs. Based on the evidence gathered from these raids, the SPA will negotiate a settlement with the offender or pursue the matter in court.

### COPYRIGHT PROTECTION FUND

The SPA has been leading the fight against piracy in North America since 1988. The SPA's anti-piracy activities are coordinated through its Copyright Protection Fund. Current participants in the Fund include Adobe Systems, Aldus, Apple, Autodesk, Borland, Central Point Software, Claris, Fifth Generation Systems, Funk Software, IBM, Lotus, Micrografx, Microsoft, Novell, The Santa Cruz Operation, Software Publishing Corporation, Symantec, WordPerfect and Xerox. Each serves as a plaintiff in cases of litigation involving pirated copies of their software. Every SPA member whose software is pirated is given the opportunity to serve as a plaintiff as well.

The Copyright Protection Fund fights software piracy on behalf of the entire PC software industry, not simply the 19 members of the Fund. Therefore, Fund participants take action against businesses and individuals who pirate not only business applications but consumer and educational software, as well. In cases where consumer and educational software is found to be pirated, those publishers are invited to join as additional plaintiffs in the suit.

Of course, the SPA isn't the only one conducting raids and filing lawsuits. A number of leading software companies have initiated their own anti-piracy programs. Novell, which employs four full-time investigators in addition to corporate attorneys, regularly files its own lawsuits. Microsoft regularly conducts raids on MS-DOS counterfeiters. And Autodesk, a leading maker of CAD software, has investigated more than 3,000 cases and recovered more than \$5 million in direct sales.

Sandra Boulton, director of copyright protection programs at Autodesk, describes her program: "While we like to recover money from persons who violate our copyright, the overriding objective of our program is to sell legitimate copies of software, not take people to court."



# THE S.P.A. WANTS YOU TO PAY FOR YOUR NETWORK SOFTWARE. ONE WAY OR THE OTHER.



Is your company at risk ?

The Software

Publishers Association has

filed more than 100

lawsuits against

companies for

software license

violations.

If all the software on

your network isn't metered,

you could be committing a

federal offense without

even knowing it.

SiteLock meters all of

the software usage on your

Novell™ network

automatically. So

you'll always be legal.

And able to prove it.

And it saves you

money by allowing you to

purchase licenses based

only on the number of

simultaneous users.

SiteLock also locks

potential problems out of your

LAN. It controls which soft-

ware programs and versions

run on the Novell network.

It even detects virus

infected or altered software

and keeps it from running.

To learn

more, call us at

800-552-9876.

**SITELOCK**  
Software Metering, Software Control  
and Virus Prevention



**BRIGHTWORK**

**800-552-9876**

SiteLock, LAN Automatic Inventory, LAN Support Center, NETremote+, P5-Print and P5-Print QueueIT! are trademarks of Brightwork Development, Inc., 766 Shrewsbury Avenue, Jerral Center West, Tinton Falls, NJ 07724.908-530-0440 (FAX:908-530-0622) Novell is a registered trademark of Novell, Inc.



# Software Piracy

## SOFTWARE PIRACY: ANALYSIS OF THE LOSS

SPA research results confirm empirical and anecdotal evidence that businesses use significantly more software than they buy.

And loss estimates are very conservative because each unit of software sold is compared to a PC purchased in the same year. Users of older PCs also buy software. Assuming that some of the current year software is sold for use on old machines, the ratio really reflects a much larger estimated loss to piracy. In addition, these estimates do not include illegal duplication of operating systems, educational software or entertainment software products, which also represent a significant revenue loss to the industry.

SPA believes U.S. and Western European loss estimates are conservative because they represent the revenue loss to software publishers but ignore channel market markup. Therefore, the loss to the entire industry is not reflected.

## THE PUBLIC AWARENESS CAMPAIGN

The SPA long ago recognized that litigation should not be the primary vehicle for broadcasting the anti-piracy message. Starting in 1988, the SPA began an active public awareness campaign to educate users about the lawful use of software. Through placement of print ads, public billboards, articles, news releases, and video news releases, the SPA has been actively working to raise awareness and prevent the spread of software piracy.

Interviews with major business and trade press, as well as with various radio and television programs, have also helped spread the message. In addition, the SPA staff and members of the Copyright Protection Fund are making speaking appearances on the topic of software piracy. Presentations are given to a variety of target audiences in cities across North America.

## GUIDELINES FOR IMPLEMENTING A SOFTWARE MANAGEMENT PROGRAM

The SPA recommends the following

### 1991 SPA ANTI-PIRACY ACTIVITIES

- Distributed 30,000 copies of SPAudit, the SPA's software inventory management tool
- Received on average 30 daily calls to SPA hotline
- Completed over 75 audits
- Sent 561 cease and desist letters
- Held 95 educational anti-piracy seminars in North America
- Filed 33 lawsuits: 81% against corporations and 19% against BBS, training facilities, schools, etc.

SOURCE: SPA

program to effectively manage a company's software inventory.

### Appoint a Software Manager

This person is responsible for implementing all aspects of the software policy, maintenance of the various detailed records, and supervision of compliance. The importance of assigning a specific person to this task must be emphasized. Employees have access to one person who is knowledgeable about all aspects of the company's software policy. In addition, assigning a person to this role further proclaims the company's commitment to software license compliance.

### Implement a Software Code of Ethics and License Compliance Program

Develop a Software Code of Ethics and a software license compliance program for all employees (See sample on next page).

### Formulate Software Acquisition Policies

All purchases of software proceed through the organization's normal purchasing channels, which require a purchase order and supervisor or management approval. Even though various software packages may be inexpensive, software is not to be purchased through employee expense reports, travel reports or from department petty cash. Purchasing documentation, including purchase orders and management or supervisor signoffs, are integrated with the software

log detailed below. Purchasing documentation, including purchase orders and management or supervisor signoffs, is integrated with the software log.

Software purchasing requirements are handled like any other company investment. The organization defines its software requirements and supervisors approve such requirements by evaluating various packages such as operating systems, database management, spreadsheets, word processing, desktop publishing, graphics, accounting, communications, utilities and programming languages. It may be advantageous to develop a company standard for a

number of these applications. The needs-assessment process is as prompt and efficient as possible. Extended lead time is avoided because this puts pressure on employees to make unauthorized copies of software as well as hardware.

Software purchases are budgeted along with hardware purchases. To provide only for purchases of computer hardware encourages illegal software copying. Software purchases can equal 50% or more of the hardware cost of the computer. Because it is a significant expense and commitment by the company and yet also enhances employee productivity, it is planned and budgeted along with other aspects of your information processing. The key to developing a realistic budget is to plan and evaluate the company's needs and requirements for software as well as hardware.

### Articulate a Storage and Security Program

The software manager delivers the manuals of the new software to individual users. The manager loads the software on the hard disk where it resides as a back-up copy. Original diskettes are kept in a separate and safe storage area. By ensuring secure storage of original diskettes when not in use, the risk of software theft and unauthorized duplication of software programs is minimized. Software is stored so that original system disks are not subject to unauthorized duplication or damage by environmental factors such as heat, fire, water, etc. This



# COPY SOFTWARE ILLEGALLY AND YOU COULD GET THIS HARDWARE ABSOLUTELY FREE.



Software piracy isn't just a crime. It's a shame. Because most people who do it aren't even aware that it's illegal. If you copy software that's protected by copyright, you could lose your job, face a civil suit, pay a \$100,000

fine and possibly be imprisoned. So get the facts now. To request more information, contact the Software Publishers Association at 1-800-388-7478. Because in a court of law, ignorance is one thing you won't be able to plead.

Please send me more information on the legal use of software.

Name \_\_\_\_\_  
Organization \_\_\_\_\_  
Title \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_  
Please check software format you prefer if you would like to receive SPAudit,  
a software inventory management tool:  
☐ DOS 3.5' ☐ DOS 5.25' ☐ Macintosh\*  
Mail to: Piracy Update, 1730 M Street, N.W.,  
Suite 700, Washington, D.C. 20036-4510

Z-1



## Don't Copy That Floppy

Macintosh is a registered trademark of Apple Computer, Inc.



process is supervised by the person responsible for software compliance within the department or organization.

### Register

The registration cards that are included in all software packages are promptly completed and mailed to the publisher. This enables users to receive technical support and notification of upgrades. Also, if users lose the receipt, the publisher has a record of the purchase.

### Don't Forget Documentation

Manuals, tutorials and other user-oriented documentation reside with the user of the software. This again encourages individuals to purchase legitimate software so that they can have a complete set of manuals and other documents from the publisher. Network environments may not choose to have a manual for each user. However, the company has a resource person available to respond to questions.

### Keep a Software Log

Maintain a software log of all software purchased by the company. The software log notes the location of each software package and the CPU on which the software is installed. The software manager maintains copies of the original license agreement and any other documents showing legitimate acquisition of software. This is filed with the purchasing documentation mentioned above. The log contains the following:

- Date and source of software acquisition, including details of the site license, volume discount or network version terms, and software serial number
- Name of the authorized user
- Existence, location and number of any back-up copies
- Copies of the registration card.

Many software purchases fall below company guidelines for capitalization as a fixed asset. Because they are not tracked

as part of a fixed asset system, they are often lost or invisible to company records. The investment in software as well as compliance issues makes the software log an essential management tool in the battle against piracy.

### Perform Audits

The audit function allows you to determine compliance with the various aspects of your company's policy on software. It includes, but is not limited to such things as a review of the company's education program regarding software, a review of the software log and license agreements, a review of the company's software budget and a review of actual software purchases. There are several steps to consider when undertaking an audit: staffing, planning, field work pro-

met.

Field work is then scheduled. Each department knows when audit personnel will be testing their systems and has all required materials and information gathered in advance. All findings are well documented and corroborating evidence is placed on file. All work is reviewed in detail to ensure that appropriate conclusions are made given the nature of the findings and evidence on file. If necessary the audit program is revised.

Once the field work is completed and reviewed the audit findings are summarized. The results are tabulated in a concise report and the appropriate conclusions presented to the company's management.

Software and data backups are an essential part of managing your computer

cedures, report and follow-up.

Audits are normally conducted by personnel who are independent of the departments that are being tested. The audit staff maintains objectivity and is free of conflicts of interest when performing the audit tests. In some companies it is difficult to assign independent employees to such an audit function, therefore training and information about the need for objectivity and independence are important.

A clear and well-defined set of objectives is established for each organization. All personnel involved in the audit are well versed in the objectives. These objectives may be discussed with the various company departments and users of software. An internal control questionnaire is used to identify internal control strengths and weaknesses. The questionnaire is designed to analyze the company's internal controls, but the auditor must consider the appropriateness of the controls given the company's operating environment.

After determination of the internal control issues, the audit program is written, reviewed and edited so that the objectives of the audit can be

**SOFTWARE CODE OF ETHICS**

The purpose of this code of ethics is to state our organization's policy concerning software duplication. All employees shall use software only in accordance with the license agreement.

Any duplication of licensed software except for backup and archival purposes is a violation of the law. Any unauthorized duplication of copyrighted computer software violates the law and is contrary to the organization's standards of conduct.

The following points are to be followed in order to comply with software license agreements.

- 1 We will use all software in accordance with our license agreements.
- 2 Legitimate software will promptly be provided to all employees who need it. No employee of the company will make any unauthorized copies of any software under any circumstances. Anyone found copying software other than for backup purposes is subject to termination.
- 3 We will not tolerate the use of any unauthorized copies of software in our company. Any person illegally reproducing software can be subject to civil and criminal penalties including fines and imprisonment. We do not condone illegal copying of software under any circumstances and anyone who makes, uses, or otherwise acquires unauthorized software shall be appropriately disciplined.
- 4 No employee shall give software to any outsiders (including clients, customers and others).
- 5 Any employee who determines that there may be a misuse of software within the company shall notify their Department Manager or legal counsel.
- 6 All software used by the organization on company computers will be properly purchased through appropriate procedures. I have read the company's software code of ethics. I am fully aware of our software policies and agree to abide by those policies.

SOURCE: SPA



# End The Guessing Game of Network Application Usage.



## Introducing AppMeter. Software usage metering for networks.

Do you have too many software licenses, or not enough? Did you buy more than you can use at one time—just to play it safe? Or are you violating your license agreements by using more copies than you own?

Would you like to stop guessing and get back in control?

You can with AppMeter. It's the powerful new metering program that makes it easy to monitor and manage user access to all your network applications, whether they're DOS or Windows.

## Maximize your applications to the legal limit.

With AppMeter, you can stay faithful to license agreements, and avoid buying more licenses than you really need.

AppMeter's comprehensive usage reports help you make informed decisions about buying additional licenses, and never worry about violations.

## Be as liberal or as strict as you want.

Best of all, AppMeter gives you the flexibility to enforce any usage policy you like.

You can limit usage of an application by locking out additional users when a specified maximum is reached. Or you can choose not to deny access, and have AppMeter produce exception reports that show when too many copies are in use.

## Comprehensive reporting, and built-in virus protection.

AppMeter keeps track of all network application usage, and lets you quickly create a number of useful reports—on screen and on paper.

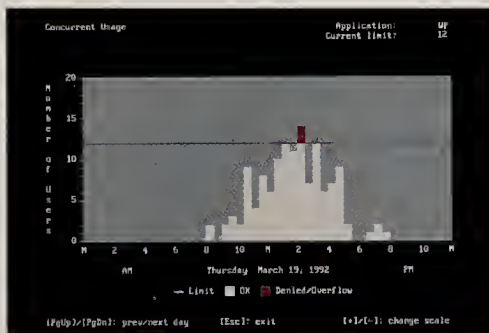
Get a snapshot of how many people are currently using each application. Generate history reports with summaries of usage over time. Touch a key and dive down a level to see the individual uses behind the summaries. Organize reports by application, by user, or by workstation. See instant bar graphs that show daily concurrent usage.

AppMeter also has virus protection built in. Turn it on, and AppMeter automatically verifies each application whenever

it runs to ensure that it hasn't been altered.

So if you want to maximize your application investment while staying legal, get AppMeter. You'll never have to guess again.

Call today for complete information 1-800-822-3865 Ext. 116 (U.S. and Canada).



AppMeter shows you concurrent application usage throughout the day in half-hour intervals, and shows how actual usage stacks up to the number of licenses you own.

History Detail by Application

Start Date:	End Date:	File Server:	Time Requested	User Name	App	OK
March 19, 1992	March 19, 1992	ACCOUNTING	03/19/92 09:00:43	KAREN	EXCEL	OK
			03/19/92 09:30:43	JOHN	EXCEL	OK
			03/19/92 09:44:05	JOHN	EXCEL	OK
			03/19/92 09:51:43	JOHN	EXCEL	OK
			03/19/92 10:00:43	JOHN	EXCEL	OK
			03/19/92 10:35:25	JOHN	EXCEL	OK
			03/19/92 10:50:43	JOHN	EXCEL	OK
			03/19/92 11:35:59	JOHN	EXCEL	OK
			03/19/92 11:20:43	JOHN	EXCEL	OK
			03/19/92 13:00:43	JOHN	EXCEL	OK
			03/19/92 13:01:43	JOHN	EXCEL	OK
			03/19/92 09:10:13	JOHN	EXCEL	OK
			03/19/92 09:12:11	JOHN	EXCEL	OK
			03/19/92 09:13:11	JOHN	EXCEL	OK
			03/19/92 10:02:13	JOHN	EXCEL	OK
			03/19/92 10:15:22	JOHN	EXCEL	OK
			03/19/92 10:45:32	JOHN	EXCEL	OK
			03/19/92 10:53:55	JOHN	EXCEL	OK
			03/19/92 11:07:43	JOHN	EXCEL	OK
			03/19/92 11:25:59	JOHN	EXCEL	OK
			03/19/92 12:17:19	JOHN	EXCEL	OK
			03/19/92 12:17:19	JOHN	EXCEL	OK
			03/19/92 12:17:19	JOHN	EXCEL	OK
			03/19/92 09:02:13	JOHN	EXCEL	OK
			03/19/92 09:15:11	JOHN	EXCEL	OK
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			03/19/92 23:53:11	JOHN	EXCEL	OK

**FUNK  
SOFTWARE**

# AppMeter

System Requirements: AppMeter meters both DOS and Windows applications. Requires Novell NetWare 2.1x or above, or NetWare 386. Includes VAP and NLW. No TSR required.

© 1992 Funk Software, Inc. AppMeter is a trademark of Funk Software, Inc. All other product names are trademarks of their respective owners.

Funk Software, 222 Third Street, Cambridge, MA 02142 Tel (617) 497-6339 Fax (617) 547-1031



# Software Piracy

## SPA SOFTWARE MANAGEMENT GUIDE

*Your tool for effective software asset management*

To assist MIS managers, EDP auditors, accountants and other managers interested in software asset management, the SPA has recently published its comprehensive Software Management Guide. The SPA's Software Management Guide is really a complete software management kit that contains all of the materials a manager needs to establish a program that will ensure that your organization is in compliance with the copyright law and applicable software licenses.

*Specifically, the Guide contains the following procedures and audit related materials:*

- **The SPA's eight point program for ensuring software compliance.** A simple eight point program that sets forth procedures for acquiring and registering software, maintaining a software log, and implementing an employee education program.
- **Internal controls questionnaire.** Sets forth the questions that will assess the existence of a software management infrastructure and management's policies regarding software use.
- **Guide to conducting a software audit.** Provides specific audit steps to determine compliance with the company's license policy. The Guide includes suggested letters for communication with management upon completion of the audit.

*In addition, the Guide also includes copies of all of the SPA's current anti-piracy materials. Among the items included are:*

- **SPAudit (DOS).** A software auditing tool that enables the user to search the hard disks of your organization's computers for more than 750 of the most common software products. You may then print a report that summarizes the number and location of each software application. You may make multiple copies of SPAudit for use within your organization.

- **SPAudit for the Macintosh.** The new Macintosh version of SPAudit. You may also make multiple copies of SPAudit for the Macintosh.
- **"It's Just Not Worth the Risk" Video.** The SPA's twelve-minute video has been distributed to more than 25,000 organizations in North America and abroad. It has become a standard for use in your employee education campaign.
- **"Software Use and the Law."** This brochure contains a clear and concise explanation of the copyright laws and how they apply to software. It can be duplicated and distributed to employees as part of your employee education campaign.
- **"Is it O.K. to Copy my Colleague's Software?"** This brochure, which may also be copied, contains answers to the most frequently asked questions regarding the legal use of software.
- **Anti-piracy poster.** The SPA's popular "Handcuffs Ad," is also included. The poster shows a picture of handcuffs with the headline, "Copy software illegally and you could get this hardware absolutely free." This humorous way of conveying a serious message has appeared in billboards in several U.S. cities.

*The guide costs \$80. To obtain more information or to order your copy of the Software Management Guide, please call 1-800-388-7478.*

SOURCE: SPA

processing. Backups however, offer an opportunity for illegal copying of software. The company's software backup policy considers this. One approach is to back up all data files separately.

### Set a Policy for Home Computers

Usage of company software at home and software from home on company computers is another area of risk. Under no circumstances does an employee bring software from home and load it on company computers. An organization's computers are company assets. To ensure that all software used in an organization is both legal and virus-free, software is purchased and installed through the company's established software acquisition process.

Frequently, publishers specify in their license agreements that company owned software cannot be taken home and load-

ed on an employee's computer if it also resides in the company's computer. If an employee is to use software at home the company purchases a separate package and records it as a company asset in the

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*"The only way for companies to deal with this pressing issue is by educating employees about the copyright law, conducting audits and enforcing anti-piracy programs."*

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software log. However, some software companies provide in their license agreements that home use is permitted under certain circumstances. Be sure to check your software license agreements to see if this applies to you.

### SUMMARY

There is no excuse for software piracy. And it will no longer be excused. Lost revenues of \$2.4 billion in the U.S., and over \$10 billion globally, on an annualized basis, cannot be ignored. Nor can the damage to the U.S. economy.

Rigorous law enforcement is becoming a reality for software pirates. The SPA and private software companies alike are striking back at offenders in the form of search and seizure orders, audits and lawsuits. This trend will only grow.

The only way for companies to deal with this pressing issue is by educating employees about the copyright law, conducting audits and enforcing anti-piracy programs. These efforts must come from top management, as employees are confused about the issue.



### SPA Executive Director Ken Wasch on Software Piracy

*As founder and executive director of the Software Publishers Association, Ken Wasch is in the software piracy trenches every day. Although he sees plenty of problems, he is also optimistic about the progress that has been made. In the following interview, he examines the critical issues surrounding software piracy and the development of corporate software management policies.*

#### **How do otherwise respectable people justify software piracy?**

Respectable people justify piracy on several grounds. First, they don't feel they need to buy a copy of software they don't use every day. They feel that because they are only going to use the application infrequently, they shouldn't have to pay for it. That's the most frequently heard argument for pirating system or application utilities. But when this software is used, its value is frequently immeasurable. Another reason is that software prices are too high. But when you think of software as an office tool that enhances productivity, the cost of software relative to the value it creates through productivity gains is really very low. Remember, without software, a computer is no more valuable than a doorstop.

#### **Do violators doubt that SPA or some other aggrieved party will actually take them to court?**

Those that doubt our determination to take violators to court do so at their own peril. They could be in for quite a surprise. I think that at this point, we have made it perfectly clear that we will not hesitate to go after any software pirates. Many of our actions have been against companies that never believed they would be caught.

#### **Software has been around for a long time. Why is the issue of software piracy getting so much attention now?**

It's getting a lot of attention now because computers have only recently proliferated to the point where they are on most white collar workers' desks. In 1981 when the IBM PC was introduced, there were one million computers in the entire world. Today, there are 50 million PCs in use in the United States alone. So it's not surprising that these millions of new computer users needed to be educated.

#### **What should someone do if they know their company is engaging in software piracy?**

The first thing they should do is notify the most senior official they can, to get his or her support in correcting the problem. The next thing to do is volunteer to help the company develop software management procedures that will correct existing problems and ensure that future copyright infringements will not occur.

#### **Do only poorly managed companies have a software management problem?**

No. Every company has a potential software management problem. We can't be sanctimonious about the fight over software piracy because every organization struggles to establish a policy and ensure that it is enforced. Successful companies have given a high priority to implementation of software management procedures.

#### **What happens when a disgruntled former employee or someone else with a vindictive attitude falsely accuses a company of software piracy?**

We've become very adept at working with witnesses who have all kinds of axes to grind. We receive 10 to 30 calls on our piracy hotline per day, and we engage in a very vigorous analysis of the allegations that are presented to us. In over 150 lawsuits that have been filed, we have made only one error.

#### **Tell us more about the software piracy whistleblower in New York City.**

This woman worked for a temp agency and used Multi-mate for word processing. In three consecutive companies where she worked, she sat down at a keyboard with a photocopied template, and it made her suspicious. With further investigation, she figured out that each one of those companies was using pirated software. We subsequently took action against these companies.

#### **Is the problem of software piracy getting worse or better?**

We think it's getting better. We get very few reports about Fortune 500 companies. The larger the company, the more likely it is they have established software management procedures. We're finding that most of our cases today involve companies that have between 50 and 500 PCs, but we've actually brought lawsuits against companies with only a few PCs.

#### **What materials are available to help companies get and stay legal?**

The SPA has produced three tools to help companies get and stay legal. The first is SPAudit and SPAudit for the Macintosh. These products have gained wide acceptance as standard tools to conduct an inventory of software applications. The second tool is the video, "It's Just not Worth the Risk." We have distributed 25,000 copies of this video. The third, and possibly most valuable tool, is our new Software Management Guide, which we've just published. It contains a comprehensive set of procedures for managing software assets.

#### **How can the costs of implementing a software management program be minimized?**

You can save money by placing someone within the company in charge of establishing a software management program. There is an up-front cost of educating the employees and conducting the first audit, but after that initial audit has been completed, the cost of maintaining an existing software management program is actually very low.



SPA White Paper  
SOFTWARE PIRACY



# WORKGROUP COMPUTING

LANs • SERVERS • SOFTWARE FOR GROUPS

## Macintosh striking corporate fancy

*Apple making strong moves to win respect, confidence in corporatewide networking market*

### ANALYSIS

BY JIM NASH  
CW STAFF

Having won the battle for respectability on the desktop, Apple Computer, Inc. is chasing network managers who must decide whether to link Macintosh islands with personal computer networks. Despite some problems and slow third-party software development, most industry observers agree that the Macintosh will become integral in corporatewide networks.

The confidence has been won

in no small measure because Apple has run apace of the industry with a parade of business agreements and new networking features. As a result, the Macintosh is growing in stature from a scrappy, quirky machine to a good corporate citizen, an equal among other networked desktop computers.

A case in point is Apple's System 7.0 operating system, which was introduced about a year ago to cautious praise from network managers. With networking features bundled into the software, the Cupertino, Calif.-based company is bleaching the Macintosh

of its image as a technological contrarian. Another key feature, the promised Open Collaboration Environment (OCE), is due this fall. OCE is expected to combine electronic mail, directory, security and other functions on a single Apple file server.

### Gaining ground

With Apple coming into the fold, IS managers have one less island to manage separately, which eases their responsibilities somewhat and even saves some money. Administrators and industry analysts alike agreed that Apple is gaining on its goal to

make the Macintosh a universal client, something that conventional thought would have dismissed even a couple of years ago.

"In workgroups, System 7.0 makes networking light-years better" than System 6.0, said Morgan Watkins, manager of micro-computer technologies at the University of Texas' Computation Center. No longer are Macintosh users on a network dependent on a dedicated Apple file server to access shared files. That can save considerable funds in large installations.

"With System 6.0, you could do E-mail, and you could share printers, but that's not networking," said Ted Bohrer, president of Concept 2001, a software vendor in Sunnyvale, Calif.

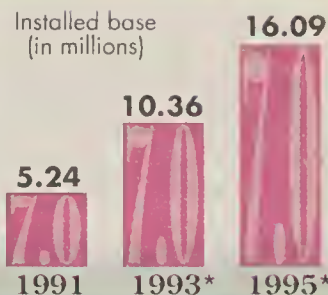
File-sharing capabilities from Apple and third-party software vendors enable users to place documents in a communal folder on their PC that remote Macintosh users as well as users with Microsoft Corp.'s DOS and Windows can access. The Publish and Subscribe function enables documents on a variety of supporting servers to be shared and automatically updated.

"Now I can drag a document into a shared folder and everyone can get at it" without a dedicated AppleShare server,

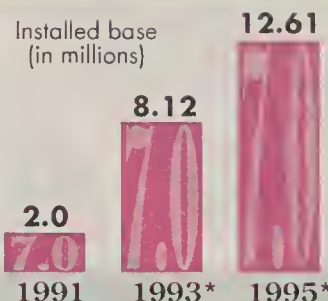
### Runs score in seventh

*System 7.0's growth is fueling the Macintosh's acceptance as a corporate-friendly computer*

#### System 7.0-ready



#### Using System 7.0



\*Projected

Source: The Hartsook Letter CW Chart: Janell Genovese

## Better — not perfect

Management concerns about Apple Macintosh networks linger despite wide-ranging software updates offered in the System 7.0 operating system.

Macintosh networks and mainframes can mix like oil and water when it comes to managing desktops with big iron, said Dan McDonald, network manager at Alaska Airlines in Seattle. In fact, McDonald said, his experience in managing Alaska Airline's 600 Macintoshes from the firm's Amdahl 5850 300E has helped him figure out what not to do when trying to manage his 150 PCs.

Performance information moving up from the Macintoshes and management commands coming down from an IBM NetView console get tied up at the cluster controller level. McDonald said that he is searching for software that will not create a similar roadblock with PCs. The Macintosh does not support NetView management

protocols, he said.

Peiter Hartsook, editor of "The Hartsook Letter," a networking newsletter published in Alameda, Calif., said other critical deficiencies are also holding the Macintosh back from becoming a universal client.

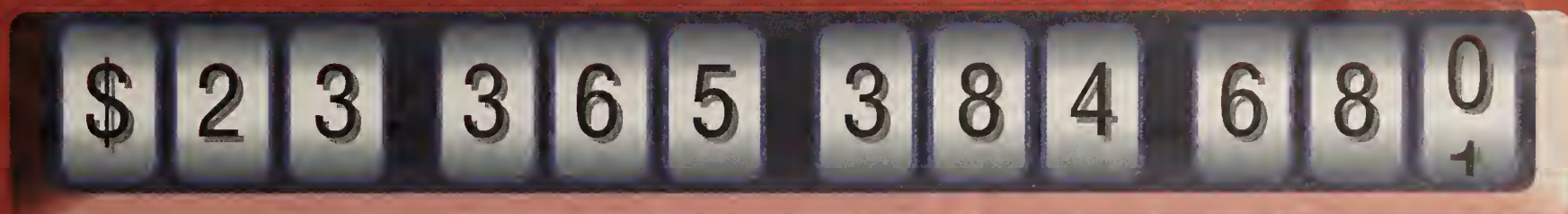
The Macintosh needs a high-performance application server. "AppleShare is a toy," Hartsook said. Offering Macintosh support on Novell and Microsoft servers is not an adequate solution, he added. To be taken seriously at all levels of the network, Apple must make its own line of servers rather than referring customers to an ally's product, he said.

Poor directory services — as well as the weakness of networking giant Novell's product line — also plague the Macintosh. Apple must develop a standards-based, automated application that lists and updates the users on all related networks, Hartsook said.

JIM NASH

Bohrer said. AppleShare is now an extension within System 7.0.

More than 100 applications now support Publish and Subscribe, according to Jim Groff, director of marketing at Apple's Enterprise Systems Division. During the last year, agreements with IBM, Novell, Inc., Banyan Systems, Inc., Digital Equipment Corp. and Microsoft have brought AppleTalk protocol support to those companies' software. Today, with Publish and Subscribe, documents can be shared from AppleShare, Novell's NetWare and Microsoft's LAN Manager servers, Groff said. Banyan's Vines and IBM's OS/2 LAN Server will ship supported. *Continued on page 58*



**By the end of this week Computerworld readers will have spent over \$23.3 Billion on Information Technology this year — representing nearly half of all IT spending to date in 1992.**

**COMPUTERWORLD**

The Newspaper of IS

Source: IDG Research Services, Fall 1991



# Visual tools enhanced

Advanced Visual Systems, Inc. in Waltham, Mass., recently unveiled an enhanced version of its popular visualization software, Application Visualization Software, plus an animation software package called AVS Animator, which allows users to turn visualized data into a "movie" in order to aid understanding of the data.

The AVS product is used today in a variety of fields such as medical imaging, computational chemistry, mechanical engineering, financial modeling, environment engineering and fluid dynamics.

Advanced Visual Systems originated at Stardent Computer, Inc., spun off into its

own firm in 1991 and then incorporated as a privately held software vendor in January.

AVS is list-priced at \$6,500 for a locked license and starts at \$8,000 for floating licenses, while AVS Animator is priced from \$1,800. Both products begin shipping immediately and will be available at the end of May on Unix and supercomputer platforms from Sun Microsystems, Inc., IBM, Hewlett-Packard Co., Digital Equipment Corp., Silicon Graphics, Inc., Convex Computer Corp., Cray Research, Inc. and Kubota Pacific Computer, Inc.

MARYFRAN JOHNSON

## IN BRIEF

# SPARC upgrade board available

■ **Opus Systems**, a supplier of Scalable Processor Architecture (SPARC)-compatible products, began shipping last week SPARCard 2, a coprocessor board for IBM Personal Computers and compatibles that reportedly upgrades their performance and functionality to that of a Sun Microsystems, Inc. SPARCstation 2. Opus, headquartered in Mountain View, Calif., based the upgrade card on a 40-MHz SPARC processor and claims it will turn any standard PC into a dual-processing workstation running both MS-DOS/Windows applications and

SPARC software.

■ **Mobius Computer Corp.** in Pleasanton, Calif., recently unveiled two new models in its Protege series of Unix workstations. The workstations are priced at \$9,365 and \$6,385 and are compatible with the upcoming SunSoft Solaris 2.0 operating system from Sun Microsystems. Based on the Intel Corp. I486 processor, which operates at 50 MHz, both systems deliver more than 30 million instructions per second of processing power with accelerated graphics and a color display.

■ **Bright Work Development, Inc.** in Tinton Falls, N.J., announced the availability of SiteLock 3.2, an antivirus and software-metering network application. SiteLock works on Novell, Inc. NetWare networks as a loadable module or value-added process and also meters Windows 3.0 and 3.1 software. The product allows network administrators to assign application-execution rights to individuals and groups. It is priced at \$495.

■ **Kodiak Technology, Inc.** will begin making Ethernet network adapter cards for Everex Systems, Inc. Kodiak said it will ship the cards, which support Novell's NetWare, Microsoft Corp.'s LAN Manager and Banyan Systems, Inc.'s Vines.

■ **Novell's** recently announced Multi-protocol Router Version 1.0 will be supported by **Newport Systems Solutions, Inc.'s** LAN2LAN routers. LAN2LAN supports Internet Packet Exchange/Sequenced Packet Exchange, Transmission Control Protocol/Internet Protocol and Apple Computer, Inc.'s AppleTalk.

Next month, Novell is expected to begin shipping NetWare Communication Services Manager Version 1.0. The Windows-based application was designed to manage software on Novell's NetWare Communication Services. It specifically spots performance, configuration and fault problems with software, including the newly announced NetWare Asynchronous Communication Services Version 3.0 and NetWare for SAA Version 1.2. Novell's suggested list price for Com Manager is \$4,995, but it offers a maximum 30% discount through July 31.

Novell announced it will ship DR Multiuser DOS Version 5.1 next week. The new version is being marketed closely with Novell's popular NetWare network operating system. Version 5.1 links for the first time with NetWare and enables up to 16 concurrent NetWare sessions on each NetWare network adapter card. It is being positioned as an alternative to NetWare Lite for companies that need heavy access to network services but do not have intense computation needs. Version 5.1 is scheduled to ship April 13 and sell for \$695.

■ **Photonics Corp.** in Campbell, Calif., has developed a wireless infrared transceiver that supports PCs running on a Microsoft LAN Manager-based local-area network. The Photonics Infrared Transceiver operates at 1M bit/sec.



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# Sun shines with success of 600MP

## ANALYSIS

BY MARYFRAN JOHNSON  
CW STAFF

The surge of success for Sun Microsystems, Inc.'s high-end line of multiprocessing SPARCserver 600MPs — with 4,000 sold in the first four months of shipping — came as a surprise to most everyone, including Sun.

An unexpected pent-up demand in the Sun user base is one likely reason systems in the \$45,000 to \$100,000 price range made such a splash for a company built on high-volume, low-margin workstations, industry analysts said.

"I suspect a fairly heavy portion of 600MP sales are for upgrades of older SPARC servers," said Jeffry Canin, an analyst at Montgomery Securities in San Francisco.

From Sun's point of view, factors such as price/performance, cost of ownership and database transaction speed explain the

brisk sales of 600MP systems, which come in two- and four-processor configurations.

"The primary driver of the server market is the desktop, and Sun has plenty of those," said Robert Kidd, an analyst at Dataquest, Inc. in San Jose, Calif. "The real issue is how many people outside the Sun customer base are buying Sun servers?"

### Technical surge

"In the initial months, a lot of these products are going into our installed base and into more technical than commercial sites," acknowledged Mike Schafir, a product manager at Sun's server systems unit. "But our commercial business is clearly where the growth is going to come."

Worldwide, the Unix midrange market is growing at a respectable rate: from \$7.17 billion in 1990 to \$8.17 billion in 1991, according to International Data Corp. in Framingham, Mass.

One of the most recent products released for the 600MP line, for example, is a new version of Database Excelsior. The \$300 Database Excelsior 1.2 product boosts system throughput and reduces response times, enabling better performance from applications running under a variety of relational database management systems.

Database performance was a key factor in the choice of a 600MP system at Hickory White, a \$60 million furniture manufacturer in High Point, N.C.

MIS director Pat Thomas said he initially added Sun to Hickory's list of open systems vendors only in an effort to be "open-minded."

"When we began looking at open systems, I thought of Sun as just a workstation company," said Thomas, who is downsizing

corporate applications from an old Burroughs Corp. mainframe. "We needed a very strong server to attach a lot of character-

for the highly computer-intensive server job necessary for aeronautical and nuclear engineering, while Brewer's Retail is upgrading three Sun 470 servers to 670MPs for database and local-area network server tasks.

"We're going to evaluate one this summer or fall as a replacement for a supermini. Once Sun gets its new chip set out, that's going to be one screaming machine," said Phil Moyer, a software support specialist at Purdue's School of Engineering, which runs a network of more than 600 Sun workstations and servers.

"We don't actually have any machines that are underpowered," Moyer noted. "It's more a case of having too many clients on

some and needing to move them off."

Brewer's Retail, a distribution cooperative for several major Canadian brewers, keeps track of the 472 government-regulated beer stores in the province of Ontario. "We are migrating now from a time-sharing [IBM] processing environment to on-site LANs with Sun acting as the database and LAN server," explained Gene Kotack, IS director. "The entire project is being funded by our IS savings as we move away from batch processing."

## Worldwide 1991 leaders in Unix midrange systems

(includes servers and terminal-based multiuser systems)

Hewlett-Packard	\$950M
IBM	\$850M
AT&T/NCR	\$785M
Sun	\$610M
Siemens/Nixdorf	\$570M

Source: International Data Corp.

based terminals to, and I didn't think Sun had something to offer there."

Yet when a Sun 630MP system running an Ingres RDBMS came out on top in a grueling benchmark test that Hickory used to measure several vendors' systems, Thomas was converted. "The Sun 630MP had the fastest raw time," he said.

At customer sites such as Purdue University and Brewer's Retail in Toronto, 600MP systems appealed to different business needs.

Purdue has a 600MP on order

# Striving to make life less taxing

## ON SITE

BY KIM S. NASH  
CW STAFF

BURLINGTON, Mass. — You might think that with the Internal Revenue Service's nasty deadline just two days away, life at Pencil Pushers, a tax preparation software maker, would be darn hectic.

Not really. The 70-member staff is resting easy, thanks in part to a new Data General Corp. Avion server and a custom-crafted database built on Oracle Corp.'s flagship product, according to Chief Executive Officer Harvey Stein.

Traditionally, the busy season for the \$10 million company is January through early February, when Pencil Pushers must update each of its 100-some packages to mirror changes in tax forms or laws released by the federal government and the 50 states.

Stein said that early last year, Pencil Pushers was hurrying to get tax packages rewritten and distributed to clients — approximately 5,000 tax professionals. The firm does not sell software to individuals.

"But this year, with the Avion, we've stayed pretty much on top and can throw our feet up on the desks," Stein explained.

Compared with Unix systems that Pencil Pushers tested from

AT&T and Sequent Computer Systems, Inc., Avion was "very price-competitive," according to Stein. He said he would have liked to pilot comparable boxes from Digital Equipment Corp. and Hewlett-Packard Co., but "we couldn't get some of those big companies in. I guess they thought the job was too small," Stein said.

Maybe so, but the change was big for Pencil Pushers. Previous-

\$300,000 to \$400,000 last spring for new computer equipment, including an Avion 5220 server, several modems, two T1 lines and an Oracle database. That figure includes software-writing help from Data Solutions Co., a former independent unit of DG that focuses on systems integration. It was recently folded into the firm's Atlanta-based Systems Engineering Group.

Now, instead of sending bulletin board messages or faxing queries, users can send electronic mail directly to Pencil Pushers' support staff using a mail feature built into each tax package. The Avion can receive incoming calls on 40 to 50 different lines.

Queries that took up to a few days to answer are now handled within two to three hours, Stein said, because E-mail is downloaded hourly. The questions are then immediately meted out to the appropriate staffer.

Pencil Pushers now distributes software updates to customers electronically, which saves time and simplifies version control.

Although it has saved money by bringing outside bulletin board functions in house, Pencil Pushers has yet to recoup its technology investment, and Stein said he does not expect to for a couple years. However, the new system has let the company gear up for future features, such as starting an electronic tax return filing service in a few years.



**Pencil Pushers' Stein** says the Avion server cuts way back on his pencil pushing — most of the time

ly, the 10-year-old firm owned little computer equipment. It contracted with an outside bulletin board service to keep clients abreast of changes to tax packages and used a fax machine to communicate with customers.

Now those functions — and more — are done via the Avion.

Pencil Pushers spent

# Macintosh striking corporate fancy

CONTINUED FROM PAGE 55

porting products shortly, he explained.

Some managers said they are pushing Apple to abandon AppleTalk altogether and embrace a more standard protocol such as Transmission Control Protocol/Internet Protocol (TCP/IP) or, preferably, Open Systems Interconnect (OSI).

Barry Fortlage, network manager for Hughes Aircraft Co.'s Ground Systems Group, agreed. From his Fullerton, Calif.-based office, Fortlage helps oversee 200-plus LocalTalk zones with 3,000 Macintoshes and peripherals. "It's a big issue in large environments like ours. We don't want to have to worry about gateways or AppleTalk routing vs. TCP/IP routing."

He said Apple officials have told him that AppleTalk protocols "have been buried so deep in the protocol stack that to have full application features on top of TCP or OSI might not be achievable."

Despite support from the network operating system vendors,

however, there has been some disappointment with System 7.0's acceptance.

Various industry estimates indicate that only 15% of all Macintoshes have the operating system. Several industry observers said they thought System 7.0 would sweep through the installed base more quickly, creating more demand for related applications.

In part, that acceptance rate can be traced to large companies that do not want to go to the trouble of upgrading all their Macintoshes with the necessary hardware and software to run System 7.0, said Jan Deruiter, president of MacVonk USA, Inc., a Marberth, Pa., software developer. MacVonk makes an application that coaches users through the upgrade steps.

Bruce Lupatkin, software analyst at Hambrecht & Quist, Inc. in San Francisco, said third-party developers have also moved relatively slowly with sophisticated software based on System 7.0. Deruiter agreed, but said the effect is insignificant.





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# NEW PRODUCTS

## Local-area networking software

Beame & Whiteside Software Ltd. has created BW-NFS for Ungermann-Bass, Inc.

The product allows Ungermann-Bass Net/One Ethernet adapters to access network resources connected via Sun Microsystems, Inc.'s Network File System (NFS). Personal computers with the Net/One adapter cards can connect simultaneously to Transmission Control Protocol/Internet Protocol and NFS networks.

The BW-NFS for UB software costs \$245.

**Beame & Whiteside Software**  
Rural Rt. 2  
576 Baptist Church Road  
Caledonia, Ontario N0A 1A0  
(416) 765-0822

Dayna Communications, Inc. has started shipping NetMouter, a software product that allows Apple Computer, Inc. Macintosh users to access Novell, Inc. NetWare file servers without running NetWare for Macintosh.

NetMouter installs on the Macintosh System Folder. Users click on the NetMouter icon to log on to the network and thereby gain full access to network file services.

The product costs \$99 for a single user and \$395 for five users. A 10-user package costs \$595.

**Dayna Communications**  
50 South Main St.  
Salt Lake City, Utah 84144  
(801) 531-0600

Micro Computer Systems, Inc. has released UniLink.

The product provides transparent interoperability between Unix and Novell, Inc.'s NetWare network operating system.

It includes two modules: UniLink Basic and UniLink NetBIOS. UniLink Basic is an application development environment that provides four virtual terminal sessions to Unix hosts, allowing NetWare

nodes to run Unix applications and execute Unix system commands. UniLink NetBIOS adds a NetWare-compatible NetBIOS application programming interface to the Unix system.

UniLink Basic costs \$995 for 24 users. UniLink NetBIOS costs \$695.

**MCS**  
Suite 800  
2300 Valley View Lane  
Irving, Texas 75062  
(214) 659-1514

## Local-area networking hardware

CNet Technology, Inc. has reduced prices across its Ethernet and Arcnet product lines by as much as 40%.

The company produces adapter cards for a variety of network topologies.

The CN120A 8-bit Arcnet card now costs \$99, down from its previous price of \$169. The CN800E high-performance 16-bit Ethernet adapter is now priced at \$239.

**CNet Technology**  
62 Bonaventura Drive  
San Jose, Calif. 95134  
(408) 954-8000

## Data storage

Vortex Systems, Inc. has announced a version of its TC376 Storage Management System for the NetFrame Systems, Inc. line of superservers.

The Vortex TC376 system provides continuous transparent backup that secures open files. It also notifies users in real time in the event of a drive failure.

The price is \$10,995.

**Vortex Systems**  
800 Vinial St.  
Pittsburgh, Pa. 15212  
(412) 322-7820

## Power supplies

Network Power Systems, Inc. has introduced the SmartWall power protection system for local-area networks.

SmartWall provides an uninterruptible power supply and electrical and data surge protection for mission-critical LANs. The product can also incorporate software for unattended monitoring and shutdown of networked personal computers.

SmartWall delivers standard utility power to regular office equipment and is housed in a movable, modular unit that eliminates tangled wiring, the company said.

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**Network Power Systems**  
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# 1992 Computerworld Editorial Calendar (January-June)

Issue Date	Ad Closings Color* B/W		Editorial Feature	Show Distribution	Ad Readership Issue	Response Card Decks
Jan. 6	Dec. 20	Dec. 27	<b>Executive Report:</b> The Information Systems Contribution to Quality			
Jan. 13	Dec. 27	Jan. 3	<b>Product Spotlight:</b> Windows Applications			Mails: Jan. 15 Space Close: Dec. 6 Mat'l Close: Dec. 9
Jan. 20	Jan. 3	Jan. 10	<b>Executive Report:</b> Customer Service <b>Industry Closeup:</b> Automotive Industry			
Jan. 27	Jan. 10	Jan. 17	<b>Product Spotlight/Buyers' Scorecard:</b> LAN Management	Communication Networks Jan. 28-30 Washington, D.C.  Windows OS/2 Jan. 28-30, San Jose, CA	Harvey Study	
Feb. 3	Jan. 17	Jan. 24	<b>Executive Report:</b> Using IS for Fast Track Product Development			
Feb. 10	Jan. 24	Jan. 31	<b>Product Spotlight:</b> E-Mail	Networkworld Feb. 11-13, Boston	Starch Study	Mails: Feb. 12 Space Close: Jan. 3 Mat'l Close: Jan. 6
Feb. 17	Jan. 31	Feb. 7	<b>Executive Report:</b> Beyond Sales Force Automation			
Feb. 24	Feb. 7	Feb. 14	<b>Product Spotlight/Buyers' Scorecard:</b> Accounting Systems			
Mar. 2	Feb. 14	Feb. 21	<b>Executive Report:</b> Information Systems at the Point of Customer Contact			
Mar. 9	Feb. 21	Feb. 28	<b>Product Spotlight/Buyer's Scorecard:</b> Client/Server Application Development		Starch Study	Mails: Mar. 11 Space Close: Jan. 31 Mat'l Close: Feb. 3
Mar. 16	Feb. 28	Mar. 6	<b>Integration Strategies:</b> Pulling Macs Into the Enterprise Network  <b>Industry Closeup:</b> Aerospace			
Mar. 23	Mar. 6	Mar. 13	<b>Product Spotlight/Buyers' Scorecard:</b> RISC Desktop Machines and Servers	DB Expo Mar. 23-26 San Francisco	Starch Study	
Mar. 30	Mar. 13	Mar. 20	<b>Executive Report:</b> Can IS be Held Liable? Liability for the Loss or Misuse of Sensitive Information			
Apr. 6	Mar. 20	Mar. 27	<b>Product Spotlight/Buyers' Scorecard:</b> PC Software—Fresh Application Categories and New Twists on Old Ones  <b>Special Supplement:</b> Innovative Windows Application	Comdex Spring '92 and Windows World Apr. 6-9, Chicago		
Apr. 13	Mar. 27	Apr. 3	<b>Executive Report:</b> Doing Business Abroad			Mails: Apr. 15 Space Close: Apr. 3 Mat'l Close: Apr. 6
Apr. 20	Apr. 3	Apr. 10	<b>Product Spotlight/Buyer's Scorecard:</b> Printers Best Suited for a LAN Environment			
Apr. 27	Apr. 10	Apr. 17	<b>Executive Report:</b> Disbursing the Power of IS		Starch Study	
May 4	Apr. 17	Apr. 24	<b>Product Spotlight/Buyer's Scorecard:</b> Midrange Systems That Run Enterprises			
May 11	Apr. 24	May 1	<b>Integration Strategies:</b> Creating an "Open" Company <b>Industry Closeup:</b> Personal Care Industry		Starch Study	Mails: May 13 Space Close: Apr. 3 Mat'l Close: Apr. 6
May 18	May 1	May 8	<b>Product Spotlight/Buyers' Scorecard:</b> Routers	Interop East May 18-22 Washington, D.C.		
May 25	May 8	May 15	<b>Executive Report:</b> Aligning IS with Business Goals			
June 1	May 15	May 22	<b>Product Spotlight:</b> What the Well-Equipped Help Desk is Using			
June 8	May 22	May 29	<b>Product Spotlight/Buyer's Scorecard:</b> MRP II			Mails: June 10 Space Close: May 1 Mat'l Close: May 4
June 15	May 29	June 5	<b>Executive Report:</b> To Be Announced			
June 22	June 5	June 12	<b>SPECIAL SUPPLEMENT:</b> <i>Computerworld's 25th Anniversary</i>  <b>Product Spotlight/Buyers' Scorecard:</b> Portable Computing (laptops, notebooks, pen-based and wireless technologies)	PC Expo June 23-25 New York City  AIIM June 22-25 Anaheim	Starch Study	
June 29	June 12	June 19	<b>Executive Report:</b> To Be Announced			

\* Includes ads placed within Executive Report or Product Spotlight sections and premium positions.

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## X Window System takes hold as users clamor for integration

BY JOANIE M. WEXLER  
CW STAFF

As companies become increasingly enamored of client/server computing and the power of Unix, X Window System developments continue to accelerate.

Recent X Window System contracts and product rollouts reflect the emerging corporate challenge of integrating MS-DOS and Microsoft Corp. Windows desktop operating systems with distributed — and often Unix-based — hosts.

The parallel is that the X Window System protocol is the “only means of distributing a windowed environment across a company’s computing resources,” said Steve Auditore, president of the X Business

Group, Inc., a research firm in Fremont, Calif.

For example, Ford Motor Co.

**T**HE GRAPHICS-ORIENTED X protocol allows PC users to tap into networked resources and display data, graphics and applications in multiple windows on one screen.

decided last month to put the Windows version of Hummingbird Communications Ltd.’s PC X server software on about

4,000 — or 10% — of its personal computers companywide.

The graphics-oriented X protocol allows PC users to tap into networked resources and display data, graphics and applications in multiple windows on one screen.

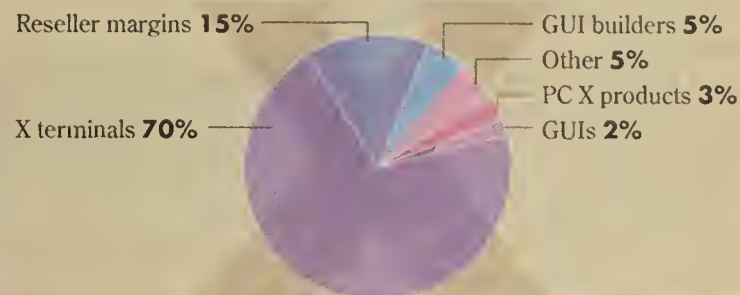
“There is a need for the business side to get to the engineering and manufacturing side,” explained a Ford spokesman. He said the automaker sees X as an enabling technology that can possibly shorten automobile production time by allowing technical writers, for example, to electronically access engineering drawings instead of waiting for paper versions to circulate through the company.

Tudor Investment Corp. in New York recently installed Ontario-based Hummingbird’s X

### Wide open

Although holding only 3% of the X market in '91, PC X products are expected to better their performance in '92

Percent of 1991 revenue: Total \$510 million



Source: The X Business Group, Inc.

server on its DOS machines to leverage its homegrown, graphics-intensive database application on PCs “without putting a Sun workstation on every desk,” said Hyung Kim, network administrator at the trading firm.

Kim explained that the Sun Microsystems, Inc. workstations are too expensive — about \$10,000 by the time they are outfitted with adequate memory — and too bulky to be justified as a standard desktop platform.

About 200 Tudor users on Novell, Inc. NetWare local-area networks toggle back and forth between the workstation-resident trading application and their local applications without having to reboot their PCs, Kim said.

This requires LAN Workplace for DOS — Novell’s Transmission Control Protocol/Internet Protocol drivers — on each desktop. The \$300 software plus the \$400 and up Hummingbird X server software and a \$500 high-resolution Video Graphics Array card bring the X networking capabilities in at less than \$1,300 per PC.

PC X server software, such as that used by Ford and Tudor, allows a PC to emulate a stand-alone X terminal.

### Smooth moves

Recent X terminal moves include the following:

- A hardware- and software-upgradable X terminal was demonstrated last month at Convention Unix '92 in Paris by Visual in Westboro, Mass.

The terminal was designed to a standard Sbus interface so users can add capabilities over time, said Andy Nilssen, vice president of marketing.

The terminal also contains a Unix application programming interface, “so I can design a terminal service on virtually any

*Continued on page 66*

## Meet Desqview/X

**Q**uarterdeck Office Systems is leveraging the X Window System protocol to help users merge traditional desktop operating systems with resources on Unix machines. The vendor announced at last month’s Federal Office System Expo in Washington, D.C., that its Desqview/X PC operating system is shipping.

Desqview/X bundles the Santa Monica, Calif., vendor’s Desqview windowing environment with PC X server software to allow a PC to emulate an X terminal and access multiple hosts simultaneously. Quarterdeck said it is pitting Desqview/X as a rival operating system to Microsoft’s Windows 3.1 and IBM’s OS/2 2.0. Like those products, it requires 4M bytes of memory, a 40M-byte disk drive and an 80386 processor.

However, since it took nearly two years after it was first announced to ship, the product “will have a huge credibility gap that the company will have to work very hard to overcome,” predicted Steve Auditore, president of the X Business Group, Inc., a Fremont, Calif., research firm that follows the X market. By the same token, Desqview/X “fits the need of bringing a DOS window onto an X device without changing DOS applications,” he said.

Several application developers who plan to port their Unix-

based products to Desqview/X to make them accessible from MS-DOS and Windows-equipped computers are also beta-testing the product. Z-Code Software Corp. in San Rafael, Calif., for example, explained that many of its recruits are more familiar with DOS than Unix “but need to use a Unix computer for advanced desktop capabilities not yet in the PC world,” said Dan Heller, Z-Code president. In addition, Z-Code markets the Z-Mail electronic-mail package that currently runs on Unix “and now runs on DOS through Desqview/X,” Heller said.

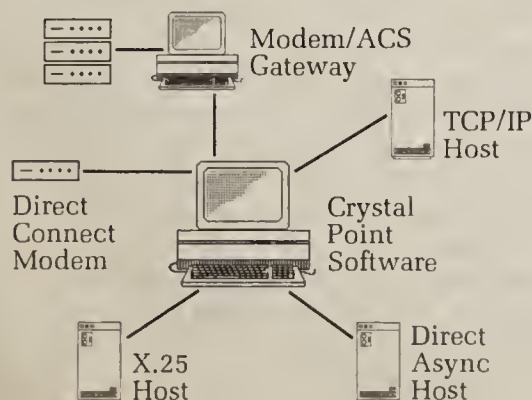
Network & Communication Technology, Inc. in Park Ridge, N.J., intends to begin beta-testing a Desqview/X version of its Planet computer-aided design product soon. Planet is a network management system for graphically documenting a company’s cabling and network devices.

The vendor is writing an interface to Hewlett-Packard Co.’s OpenView/Motif window manager, Sun Microsystems, Inc.’s SunNet Manager/Open Look and Novell, Inc.’s Microsoft Windows-based NetWare Management System, said Bill Spencer, Network & Communication’s president.

The \$275 Desqview/X software includes drivers supporting Novell IPX and NetBIOS transport protocols, so “if I want to interface to the NetWare Management System, that’s all I need,” Spencer said. Support for TCP/IP transport to link to the Unix boxes costs an additional \$200.

JOANIE M. WEXLER

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# Bank net service calls for X.400 and more

BY ELISABETH HORWITT  
CW STAFF

BRUSSELS — Committed to supporting networking standards on its international banking network services, the Society for Worldwide Interbank Financial Telecommunications, or S.W.I.F.T., has nevertheless had to supplement the CCITT X.400 protocol with homegrown features before the electronic-mail standard could be used in a new bulk file-transfer service.

S.W.I.F.T. is a telecommunications network jointly owned by a cooperative of 239 U.S., Canadian and European banks. The organization's X.25 packet-switched network services support interbank communications applications, such as funds transfer, for some 3,000 financial institutions worldwide.

S.W.I.F.T.'s newest service, scheduled for June release, is Interbank File Transfer (IFT). The service was designed to support transmission of high volumes of data, such as a series of pay-

ments that a government might send to overseas pensioners, said S.W.I.F.T. spokesman Richard Metcalf. This is in contrast to current S.W.I.F.T. services, which support short, highly formatted messages such as large-

developing the software that banks use to access S.W.I.F.T. network services.

IFT is the first fully Open System Interconnect (OSI)-compliant application to be offered by S.W.I.F.T., the company said.

data transfer over a store-and-forward X.25 network, he added. The S.W.I.F.T. subsidiary has proposed the enhancements to CCITT as the basis of file transfer between applications over X.400, Price said.

The enhancements were made to the CCITT's 1984 version of X.400 because that is the version that most commercial X.400 products now use, Price said. S.W.I.F.T. plans to support the 1988 version of X.400 as soon as it becomes more widely implemented on products.

S.W.I.F.T. Terminal Services also had to come up with software to allow transparent links between bank hosts and IFT services. The company plans next October to release Open Interface for Applications software, which works with IFT interface software to turn either an IBM Personal System/2-OS/2 or a Digital Equipment Corp. VAX/VMS system into a gateway to the new service. The gateway takes transmissions sent from a bank's host and puts

them in X.400 envelopes.

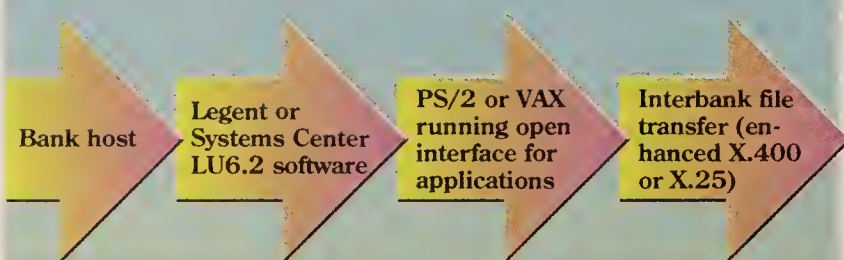
The last missing piece was software that connected banks' range of mainframes and mini-computers to the IFT gateway. S.W.I.F.T. Terminal Services has tapped Systems Center, Inc. and Legent Corp. to enhance its existing bulk transfer software packages with Open Interface for Applications support.

It did not concern S.W.I.F.T. that both firms' products use IBM's LU6.2, and not OSI, as a transport protocol, Price said. More important was the fact that Systems Center's Network Data Mover and Legent's Xcom 6.2 products provided automated bulk file transfer across a variety of systems and are already "well-established in the financial community," he added.

A second project now in pilot phase at S.W.I.F.T. involves supporting the EDifact electronic data interchange formats that many banks now use to standardize messages to their customers, Metcalf said.

## Keystone

LU6.2 software helps S.W.I.F.T. prepare host-based transactions via X.400 or X.25



CW Chart: Tom Monahan

value payments.

The IFT service uses the CCITT X.400 E-mail protocol to support bulk data transfer over S.W.I.F.T.'s X.25 packet-switched network, said Roger Price, a product manager at S.W.I.F.T. Terminal Services. The division is responsible for

However, S.W.I.F.T. Terminal Services had to make several enhancements to the protocol before it could be used as the basis of the new service, Price said. Enhancements included security features, which are critical in banking transactions, and the ability to handle automated bulk

## Regional Bells aiming for speedy SMDS deployment

BY ELLIS BOOKER  
CW STAFF

If the regional Bell holding companies learned one thing from their experience with Integrated Services Digital Network (ISDN) in the 1980s, it was the hazard of getting a switched, data-networking service out the door too late.

This time around, the offering is called Switched Multimegabit Data Service (SMDS), and the regionals seem intent on getting it out as soon as possible.

All seven regionals have SMDS trials under way, with tariffed offerings due later this year or early next year. Bell Atlantic Corp. is the first with a commercial customer in the form of the General Services Administration (GSA).

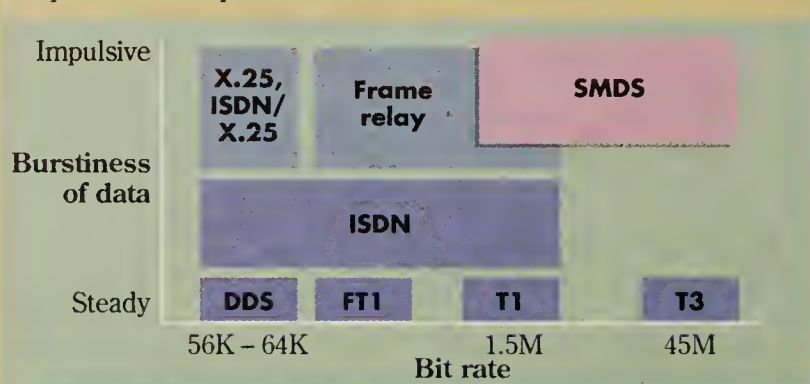
Robyn Aber, the SMDS product manager at Bellcore, the Livingston, N.J.-based research and development arm of the seven regional Bell holding companies, said the companies are on record as planning to have SMDS in 30 U.S. markets by early 1993.

In addition, Bellcore is playing the role of referee with its Broadband National Services Planning Team, making sure that the SMDS services can eventually interoperate over interexchange networks. Tests of local and long-distance SMDS and networks have already occurred, although commercial services are not expected until next year.

Meanwhile, an educational effort is under way as the regionals attempt to explain how SMDS compares with frame relay, an-

### Where it sits

Switched Multimegabit Data Service is positioned at the high end of the public service spectrum



Source: International Communications Association

other fast-packet technology that has been taken up in force by the interexchange carriers and that is already available as a cost-effective alternative to dedicated private-line networks.

But frame relay and SMDS are not competing technologies as much as they are "complementary ones," according to H. Charles Baker. Baker is the technical consultant for the SMDS

Showcase that the International Communications Association (ICA) plans to put on at the 45th Annual ICA Conference and Exhibition in Atlanta next month.

As part of the ICA showcase, which is being built in conjunction with Atlanta-based Bell South, ICA is making an effort to clear up what it sees as confusion among users about the relationship of frame relay to SMDS, as well as how these technologies relate to familiar networking protocols such as X.25.

One example of the educational effort is a chart showing a variety of data networking technologies, including X.25 and ISDN and their relationships.

While frame relay and SMDS have different bandwidth profiles, the real difference between the two, according to analysts such as Baker, lies in the fact that SMDS has a 15-digit addressing scheme and therefore can be used in an unlimited public network. In contrast, a single frame-relay network can have a maximum of 992 addresses.

## SMDS roundup

The following is a roundup of where various regional Bell holding companies stand on SMDS service offerings:

- Bell Atlantic is the first of the regionals with a commercial customer: the GSA. Customers in Philadelphia and Pittsburgh can also buy a 1M bit/sec. SMDS "trial service" for \$500 per month. Commercial 1M bit/sec. service is planned for the Washington, D.C., area by mid-year, with DS3 rate (45M bit/sec.) scheduled for mid-1993.
- U.S. West, Inc. is in an SMDS medical imaging

trial in Minneapolis and plans to offer tariffs in nine cities by December.

- BellSouth Corp. is conducting an internal test, connecting three sites in three cities.
- Nynex Corp. is working with internet provider Advanced Networking and Services, Inc. and PacBell on a test of interexchange SMDS and wide-area Transmission Control Protocol/Internet Protocol.
- Ameritech said earlier this year that several Detroit-based businesses would begin a trial of SMDS services this summer.
- Pacific Bell is conducting SMDS tests with Rockwell International and Nynex (see above).
- Southwestern Bell is in a technical trial in Texas involving medical imaging.

## X Window System takes hold

CONTINUED FROM PAGE 65

Unix workstation and port it to run in the terminal," Nilssen added. He said Visual will ship the terminal during the second quarter of this year and price it competitively with 19-in. color X terminals, which he pegged at about \$5,500.

• Human Designed Systems, Inc. in King of Prussia, Pa., said last month it has added the industry-standard Point-to-Point Protocol (PPP) to its reduced instruction set computing-based X terminals. PPP will allow compressed X applications to run over serial communications lines while the terminal simultaneously supports an Ethernet link.

• Tektronix, Inc. in Wilsonville, Ore., last month continued to round out its offerings with niche products. The company introduced two low-end X terminals: the 19-in., \$2,495 XP12 monochrome display and the 17-in., \$3,795 XP18 color terminal.

Steve Byers, a senior computer-integrated manufacturing engineer at Cummins Engine Co. in Columbus, Ind., is testing the XP18 and said it fits "in an office environment where you're not running [fast] CAD applications but can handle multiple open applications" on the screen at once. The terminal is overkill for users who feel comfortable running just one or two applications at a time, he said. He pegged the monochrome version as desirable for text-oriented database applications such as phone support and telemarketing.



IN BRIEF

# Canadian firm buys IBM voice network rights

■ **TSB International, Inc.** has bought the exclusive rights to develop, market and support IBM's NetView Voice Network Administrative Services, a family of programs designed to track and allocate telephone expenses, optimize voice network use and manage telecommunications facilities. TSB will market the program under the name Integrated Network Administration System. TSB is a Toronto-based company that sells products to manage multivendor telecommunications devices. It has been an IBM Business Partner since 1989.

■ **U.S. Robotics, Inc.** released 10 new models in its Sportster and WorldPort product lines. These will include fax and data modems at speeds ranging from 2,400 to 14.4K bit/sec. The first releases will begin shipping this month. The Skokie, Ill.-based manufacturer also released Blast Remote Control for Procomm Plus, a product designed to let Procomm users gain remote access to another personal computer.

■ **SoftSwitch, Inc.** and **Ardis** will work together to link wireless networking technology with electronic-mail systems. Wayne, Pa.-based SoftSwitch plans to use its SoftSwitch Network Applications Programming Interface to integrate wireless networks into wide-area mail networks.

Ardis is a partnership of IBM and Motorola, Inc. that provides a nationwide radio data service between mobile computers and mainframes. SoftSwitch sells multivendor E-mail gateways.

■ **Fibermux Corp.** will enhance its LightWatch with support for **Hewlett-Packard Co.**'s Openview Network Node Manager. This will extend LightWatch's management capabilities beyond Fibermux's own Crossbow line of intelligent hubs to other vendors' network devices.

The Openview version of LightWatch will migrate to support of Common Management Information Protocol and the Open Software Foundation's (OSF) Distributed Management Environment, Fibermux said. LightWatch currently runs on a **Sun Microsystems, Inc.** Sunnet Manager platform and is compliant with Simple Network Management Protocol (SNMP).

■ **Wellfleet Communications, Inc.** has announced support for multiple local-area network transport protocols over the Point to Point Protocol, an industry standard that provides interoperability across multivendor LAN interconnectivity devices.

■ **Chipcom Corp.** has announced that it will market **Remedy Corp.**'s Action Request System as a way for users to track problems, inventory and configurations across the Chipcom Online System Concentrator family of intelligent hubs. Remedy's software runs on Sun's Sunnet Manager, which is also supported by Chipcom's recently announced OnDemand Network Control System management application.

■ **Northern Telecom Europe** and its subsidiary, **STC Submarine Systems,**

have completed what is said to be the world's first undersea demonstration of Synchronous Transfer Mode-16 technology. STM-16 is an optical fiber-based network standard that supports up to 2.5G bit/sec. The pilot system, which ran between the UK and France, has a capacity in excess of 30,000 circuits per fiber pair on a link without underwater repeaters, Northern Telecom said.

■ **Network Computing, Inc.** has acquired exclusive rights to Netmagic from **Netmagic Systems, Inc.** Netmagic is a Microsoft Corp. Windows-based appli-

cation for managing Novell, Inc. networks. It is said to perform the same NetWare systems management functions as Novell's Syscon, Fconsole and Pconsole utilities. Network Computing also sells LANalert Network Management, a set of modules that reside on Novell clients and servers and notify network managers of impending problems, such as if a server is running out of directory entries or CPU power. Network Computing has also recently announced a NetWare 3.11 version of the system.

■ **Lexcel, a Micro Technology, Inc.**

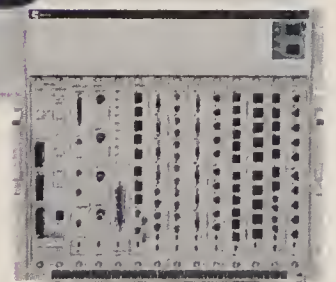
company, has joined the OSF and plans to implement the OSF's Distributed Management Environment in its Lance+ product, the company said. Lance+ is an SNMP-compliant system for managing bridges, routers, hubs and T1 multiplexers.

■ **The Frame Relay Forum** has formed a speaker's bureau to provide free educational presentations on frame-relay technology and market issues to U.S. and Canadian organizations. The 30- to 40-minute presentation reportedly contains no vendor-specific information. Firms and other organizations wishing to request a presentation should contact the Frame Relay Forum at (415) 962-2579.

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NEW PRODUCTS

Network management

Independence Technologies, Inc. has announced iVIEW SNMP Agent Kit.

The product allows users to integrate an unlimited number of private management information bases into the iVIEW Simple Network Management Protocol Agent. It generates the required code automatically, eliminating the need for programmers to understand SNMP, the company said.

The product costs \$10,000 when purchased with the iVIEW System Manager and \$15,000 when purchased separately. Runtime fees range from \$200 for a

workstation to \$1,500 for a large server.  
**Independence Technologies**  
42705 Lawrence Place  
Fremont, Calif. 94538  
(415) 438-2000

Brightwork Development, Inc. has upgraded its SiteLock software metering and antivirus software.

Version 3.2 offers a new Directory Security Mask feature that enables the network administrator to grant specific directory security rights to users and groups of users when an application is being executed. Users not running the application do not have access to the specified directories. The feature is available for

Novell, Inc. NetWare 80386 local-area networks.

The new version also provides enhanced performance and improved metering capabilities.

The price is \$495 per server.  
**Brightwork Development**  
766 Shrewsbury Ave.  
Jerral Center West  
Tinton Falls, N.J. 07724  
(908) 530-0440

Vycor Corp. has announced LANScan, an asset management tool for local-area networks.

The product detects and identifies number and type of central processors, drives, coprocessors, parallel and serial ports, video cards and version numbers of

operating systems and shells. All collected information is stored in a database on the network server.

The price is \$595 per server.

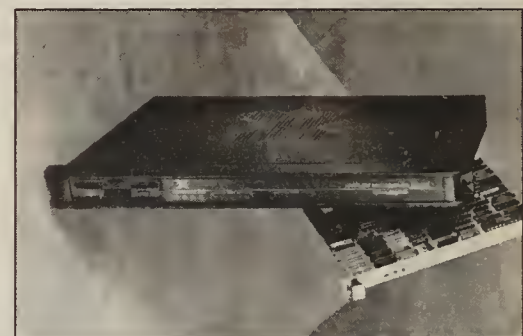
**Vycor**  
5411 Berwyn Road  
Berwyn Heights, Md. 20740  
(301) 220-4450

Gateways, bridges, routers

Gandalf Systems Corp. has announced the Access Router family of internetworking products.

Access Router products, developed in conjunction with Proteon, Inc., are integrated with Gandalf Systems' intelligent wiring hubs. The line includes an Ethernet-to-Token Ring router and the AR 7422 (\$8,995), which allows users to access integrated Token Ring subnetworks on Ethernet backbones and vice versa. Also included are the AR 7220 (\$7,995), which provides a high-performance dual wide-area network configuration, and the AR 7420 local router (\$6,195) for Ethernet-to-Ethernet connectivity.

**Gandalf Systems**  
Cherry Hill Industrial Center - 9  
Cherry Hill, N.J. 08003  
(609) 424-9400



**Xyplex's local routers** are offered in two platforms, both of which route IP and IPX traffic.

Xyplex, Inc. has added to its line of Local Router internetworking products.

The 3210 and 3710 Local Routers are intended to connect workgroups to corporate Ethernet backbones. Both devices route IP and IPX traffic while simultaneously bridging other protocols. They support Simple Network Management Protocol and can be managed remotely.

The 3210 (\$3,695) is a stand-alone unit with two 15-pin interfaces. The 3710 (\$2,995) is a card that plugs into the Xyplex 4550 intelligent chassis. Forwarding performance for both models is up to 6,000 packet/sec.

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Micro-to-host

Systran Corp. has created the Model P1600 interface, which lets users integrate personal computers into real-time data acquisition networks.

The Model P1600 consists of an interface card installed in the host system and an external unit that holds the replicated shared-memory boards and network boards. It allows users to transfer data at 150M bit/sec. over the company's SCRAMNet fiber-optic network.

Pricing per node ranges from \$6,900 to \$9,800.

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# LARGE SYSTEMS

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## IBM seeks to 'rightsize' with AS/400

### ANALYSIS

BY SALLY CUSACK  
CW STAFF

Never one to miss an opportunity, IBM has joined the downsizing frenzy with its own buzzword: "rightsizing." It is embodied in IBM's campaign to work with users as they identify the right computing platform for their environment.

One aspect of the plan is that IBM's Application Business Systems (ABS) Group is aggressively targeting older System/370 systems for rightsizing to the Application System/400, according to Theresa Elms, president of Elms Information Ser-

vices Group, a market research firm in San Diego.

"When IBM was one integrated monolithic unit, the ABS was constrained in its marketing effort so as not to undercut the mainframe market," Elms said. "Now they have carte blanche to sell AS/400s any way they want to. This same philosophy is also true for the mainframe area."

Analysts estimate that AS/400 sales account for between 40% and 50% of IBM's new accounts. That midrange platform is a \$14 billion business for the company.

The savings available to lower end, 4300 series and DOS/VSE users who migrate to the AS/400 platform is estimat-

ed in the neighborhood of half a million dollars each year, said William Sines, an analyst at Technology Investment Strategies Corp., a research firm in Framingham, Mass. This is roughly 38% of the mainframe information systems budget, including hardware, software, personnel and support, Sines said.

### Hershey shucked 4341

Bill Schaeffer, manager of IS at Hershey Entertainment & Resort Co. in Hershey, Pa., moved off an aging 4341 back in 1988 when the AS/400 first debuted, citing cost control as the primary reason.

"We went from a staff of 17 people to a staff of 10, mostly re-

ducing our operations departments," Schaeffer said. The system runs all of the corporation's financial and human resources functions and has five Novell, Inc. NetWare-based local-area networks linked into it.

One of the biggest challenges in the migration, Schaeffer said, was getting the users to become more active in deciding how their systems work. Now

that there are no operators, they have learned how to schedule and run their own jobs. He estimates the learning curve at between two and three months for most users.

While IBM does not give out numbers, it is estimated that approximately 450 IBM customers rightsized in 1991, and about 40% of those constitute smaller or older mainframe installations. These numbers are backed up by software companies dedicated to the AS/400 marketplace.

For example, R. Douglas MacIntyre, president of Software 2000, Inc. in Hyannis, Mass., said 38% of the firm's 1991 sales were generated by mainframe-to-midrange converts. This includes companies such as MCA Records, TRW, Inc., Playboy Enterprises, Inc., Sunkist Growers, Inc., Bausch & Lomb and The Promus Cos.

Some 4300-class system users are not ready to move anywhere soon, however.

"My headquarters asked me to consider rightsizing three months ago," said Wayne Kaufman, director of data processing at Pacific Electric Co. in Gardena, Calif. "I went to IBM, and the conclusion was that we are

### Fertile ground

IBM's 'rightsizing' program for AS/400 sales efforts targets users such as the thousands of sites running low-end 370-type systems

System	Installed base 1991
AS/400/04-25	19,300
AS/400/30-45	14,700
AS/400/50-70	10,800
AS/400/80	70
4381	5,420
9373	1,300
9375	4,030
9377	2,180

Source: Computer Intelligence

already rightsized — we're running as economically as possible."

Pacific Electric currently uses an IBM 4341 DOS/VSE-based system, and according to Kaufman, the system still has plenty of capacity. The company owns the computer outright and does not use IBM maintenance.

Does rightsizing present a dilemma for the folks at IBM, who have long enjoyed the large profit margins associated with big-iron configurations? According to Terry Baehr, director of ABS marketing at IBM U.S., the answer is no.

"A lot of people seem to think we are having contention with our large-iron sales force," Baehr said. "The customer is doing a lot of deciding in terms of what they want. We won't battle high-end 370 customers away from that decision."

Murphy Oil Corp. in El Dorado, Ark., on the higher side of the 4300 spectrum, relies on an MVS-based 4381 for all data processing. Glenn Knox, senior systems programmer, said that if anything, the company would move up to an Enterprise System/9000.

## EMC targets midrange storage arena

BY SALLY CUSACK  
CW STAFF

HOPKINTON, Mass. — As the IBM midrange storage competition heats up, EMC Corp. has joined the fray with the announcement of its Harmonix Series of Integrated Cache Disk Array (ICDA) products designed specifically for IBM Application System/400 users.

Hot on the heels of the competition (IPL Systems, Inc. announced an IBM-compatible disk earlier this month), EMC's ICDA drives are available in both 5¼- and 3½-in. formats.

The ICDA provides as much as 128M bytes of read cache memory in 16M-byte increments and offers write cache capabilities via an intelligent controller that regulates the flow of data between the CPU and the Direct Access Storage Device.

"The [IPL and EMC] prod-

ucts are conceptually similar; both include cache controllers and dynamic sparing capabilities," said Greg Strakosch, president of Reliability Ratings, Inc., a Needham, Mass.-based research company.

Dynamic sparing provides an additional Head Disk Assembly

**T**HE ICDA provides as much as 128M bytes of read cache memory in 16M-byte increments.

(HDA) to ensure maximum uptime for AS/400 users.

However, IPL uses IBM as its OEM for drives, while EMC uses Seagate Technology, Inc. and Micropolis Corp. HDA technology.

While the IPL/IBM arrangement may give some solid blue customers the warm fuzzies,

EMC may have deliberately chosen Seagate and Micropolis as manufacturers to avoid having critical component deliveries controlled by a major competitor, Strakosch said.

The 5¼-in. ICDA HX5 subsystem supports up to 6.8G bytes of capacity in seven inches of rack space. Options include a 1.7G-byte add-on drive and 16M-byte cache expansion.

The 3½-in. HX3 offers as much as 6.8G bytes of disk storage with a cache capacity ranging from 32M to 128M bytes in a standard 5¼-in. rack space. Options include an 857M-byte add-on disk drive and a 16M-byte cache expansion.

Both units are fully compatible with the IBM 9336 and support the Small Computer Systems Interface II.

Prices start at \$65,000, and the products are available immediately.

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# Getting the scoop on customer service

BY JOHANNA AMBROSIO  
CW STAFF

AKRON, N.Y. — Bigger does not necessarily mean better where customer service is concerned. Or so Perry's Ice Cream Co. is trying to emphasize with an overhauled computer system that focuses on keeping customers happy.

Managers at the \$39 million regional processor and distributor, based just outside of Buffalo, N.Y., said the new system has performed better than a sunshine-resistant variety of frozen yogurt. Not only are customers more satisfied because their orders are filled more efficiently, but Perry's has reduced its staffing requirements as well.

Before the new system was installed, an order-entry staff of 13 people collectively put in about 30 hours of overtime each week during the peak season that begins on April 1. During the summer of 1991, however, seven order-entry people worked only 16 hours of overtime for the entire season.

The problem with the old set-

up — a turnkey Qantel Corp. system used for financials, route distribution and production planning, among other things — was that it was not powerful enough to allow the order-entry people to type in orders while the customers were still on the phone. Instead, the Perry's representatives wrote the orders down manually and, usually several hours later, entered the information into the system.

## Not customer-friendly

"We were running blind," said Bill Storr, MIS manager at Perry's. "Invoice levels would change dramatically, but we didn't know that when the customer was on the phone. We may have already sold out of the product he had ordered."

This situation did not make for a bunch of happy customers, Storr said. "Customer service was the No. 1 driving force behind the new system," he said.

Perry's management decided to act on the problem in late 1990 with an overhauled computer system anchored by a Digital Equipment Corp. VAX 4000

Model 300 with a suite of software from Datalogix International, Inc.

With the decision made and the new gear ordered, the issue became the looming April 1,

1991, deadline to get the system up and running. That day marks the beginning of the busy six-month season.

Between the computer's arrival on Jan. 28 and the April 1 deadline, the company implemented about 10 of Datalogix's Cimpro modules, including financial, order processing, purchasing, inventory control and material requirements planning modules.

Storr said he decided not to run parallel systems, opting instead to put all his eggs in the new basket as of April 1. "It sounds drastic, but running two systems takes longer. This really motivates people to do it."

Storr acted as the primary implementor along with Perry's purchasing manager and some representatives from other departments. Before April 1, they set up master files about customers and

product lines — things that would not change.

Then, on Easter weekend 1991, they shut down the old computer system as of Friday night and converted all the "live" files, including purchase orders, accounts receivable and

other kinds of information, from the old system to the new one.

To do this, the Perry's group imported flat files from the old system to a personal computer and then uploaded from the PC to the DEC machine.

Initially, customers were not that receptive to the idea of ordering by part number instead of by product type. Under the old system, customers would simply order five half-gallons of vanilla and now they were being asked to have identification numbers for everything they ordered.

Now, however, customers think the benefits are worth the change, Perry's managers said. "It speeds up the process and puts all kinds of information at the fingertips of the customer service representatives," said Carl Patterson, manager of direct store delivery and the person responsible for customer service. "In the past, just because we took an order didn't mean we could fulfill it. Now we can."

In addition, Perry's employees have been making better use of the computer-generated information about customers and product lines, Storr said. While no modifications to the master computer system are planned anytime soon, the company is looking into giving its truck drivers handheld computers to help them maintain better inventory of their trucks.

"We have the basic infrastructure," Storr said, "and now we want to add depth and maturity to that by using data more effectively."



## Perry's Ice Cream Co. Akron, N.Y.

- **Problem:** Service representatives could not accurately tell customers what the inventory was and whether their orders would be fulfilled.
- **Resolution:** An entirely new computer system that included a DEC VAX 4000 Model 300 and Datalogix International's Cimpro financial and manufacturing software.
- **Benefits:** Happier customers, reduced staff and decreased overtime.

CW Chart: Janell Genovese

# EDS jumps into imaging market ring

BY NELL MARGOLIS  
CW STAFF

DALLAS — These days, if you spit, chances are you will hit a computer products vendor that is suddenly reborn as a service provider. But last month, service provider Electronic Data Systems Corp. turned the tables and threw its 10-gallon hat into the imaging vendors' ring.

Fresh from two years' worth of internal testing and targeted initially at large financial institutions, EDS' image statement service is now open for business at EDS processing centers in San Diego.

Image statements are digitally reproduced pictures of checks that can be substituted for the wads of cashed checks customarily returned with monthly bank statements.

A slimmer envelope means postal savings for the bank; a page or two of pictures instead of a packet of checks means time savings and decreased confusion for the customer. Perhaps most tantalizing to financial institutions, however, is American Express Co.'s early success with the process, which it dubbed "Country Club billing."

## Making a difference

There is a catch — one on which EDS plans to capitalize.

"A bank that can offer its customers check image statements can claim one of the few real dif-

ferentiations available in the overcrowded banking arena today," said Dan Talbot, national back office product manager for the firm's Financial Industry Business Group. In addition to the basic service, Talbot said, user banks can take the differentiation a step further by wrapping their own products around the image statements.

However, he added, cash-strapped banks are currently ill-positioned to make huge dollar investments in unproven technology.

Enter the service utility, which effectively allows customers to charter the costly imaging capability. EDS reasons that banks will sign on to the service because it allows them to buy into the competitively alluring imaging concept without buying the top-dollar technology.

Theoretically, "what they say makes a lot of sense," said New Orleans-based banking consultant Arthur Gillis.

"Every time I talk imaging to any banks, the first thing they say is, 'It's too expensive for us,'" Gillis noted.

Even the huge banks that can risk a substantial investment in imaging, Gillis said, are reluctant to go it alone: \$45 billion Fleet/Norstar Financial Group in Providence, R.I., for example, is mak-

ing its foray into imaging in partnership with IBM.

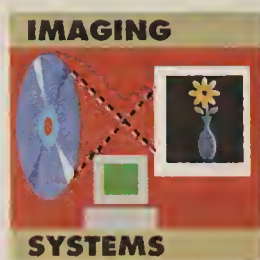
"EDS has the right model and the right target," Gillis said, "but the banking marketplace today is stunned; institutions are acting exactly like they've been hit with stun guns. I'll believe this takes off when they show me."

According to Talbot, after four weeks in the commercial market, EDS does not yet have a signed contract for its new offering, although Talbot claimed that "there are a lot of discussions ongoing."

EDS is thinking long term, Talbot said. A member of IBM's image check processing beta-test program, EDS "is working closely with IBM standards" and is planning a five-point imaging rollout, of which the recently released image statement is the first release.

The multiple-image proof-of-deposit product, which includes item capture, balancing, reject processing and power encoding features, is expected to be available by the end of the current calendar year, Talbot said.

And as EDS deepens its image-provider role, it intends to widen it as well, eventually making the full slate of image-based back-room services available in all 43 of its processing centers.



## IN BRIEF

# Apple, DEC detail pact


■ **Apple Computer Europe and Digital Equipment Corp.** Europe recently revealed more details of a distribution agreement that was announced last November. In a jointly released statement, the vendors said the agreement will allow DEC subsidiaries in Europe to provide Apple Macintoshes and peripherals to large DEC accounts within the context of "integrated solutions" involving both DEC and Apple products.

■ **Database Server Systems, Inc.** is offering a training program on client/server technology for information systems. The company, which named the program Client/Server Boot Camp, said the courses are vendor-independent and focus on general topics and case studies. However, the program will provide overviews on top relational database management products as well, including those of Oracle Corp. and Sybase, Inc. The Boot Camp costs \$700 for three days.

■ **IBM** announced that **Premenos Corp.**'s electronic data interchange (EDI) translation and management software for the IBM Application System/400 midrange system is generally available in the U.S. The latest version, Premenos EDI/400 6.5, is being jointly marketed by IBM and Premenos. It reportedly incorporates features of IBM's Data-Interchange/400 product, which is no longer being sold.

■ **Network storage vendor Epoch Systems, Inc.** in Marlboro, Mass., last week announced an alliance with **Storage Technology Corp.** Storage Tek will resell EpochServ and EpochMigration Manager software as part of an enterprise-wide network data management line. Epoch will also offer its network data management software to OEMs in source code form as a software-only product.





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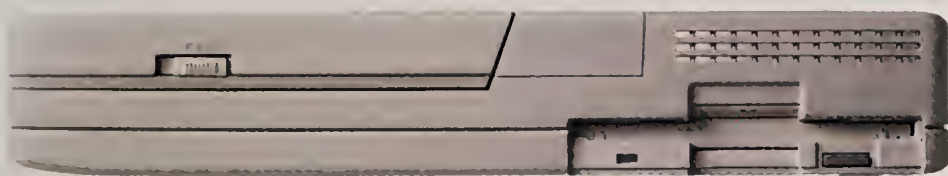
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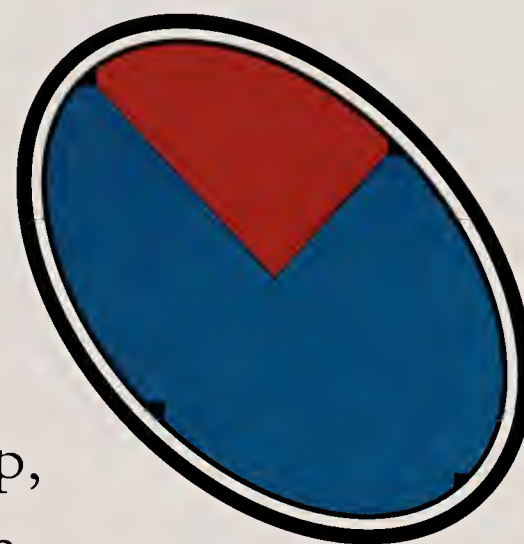
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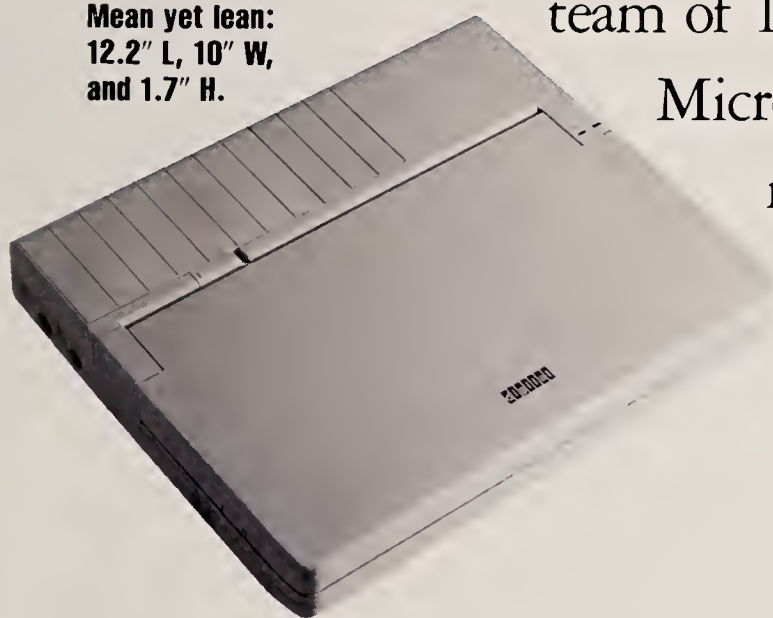
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## THE WINNER BY A TKO

### The DECpc 420sx



Every i486-based system to come along stakes a claim to the heavyweight PC title. But as the saying goes, the bigger they are, the harder they fall.

That's why Desktop Direct from Digital built a 20MHz i486sx system that's lean enough to be affordable (at \$2,429) and mean enough to deliver a knockout blow.

Besides support for 32MB memory, the 420sx packs a punch that hits you right between the eyes: state-of-the art, non-interlaced video technology for 1024 x 768, 256 color graphics.

And because Digital's engineers are always in training, they designed the 420sx to have every possible competitive edge in PC prizefighting. One





example: all components—including the video and memory—are installed on the main logic board. That means better performance without higher prices.

What's more, the 420sx is always ready to step up to a real heavyweight challenge. Its standard 4MB of memory is expandable to 32MB, and an 8KB memory cache is constantly jabbing away. Storage options include 52MB, 105MB and 120MB IDE hard drives and 209MB and 426MB SCSI hard drives. That's just the bulk you need to step into the ring with the big guys. And of course, the 420sx comes preloaded with DOS 5.0 and Windows 3.0—so you're ready for a workout right away.

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Keyboard: 84-key  
Mouse: Logitech™ TrackMan® Portable  
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Microprocessor: Intel i486 running at 33MHz  
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 Storage: 40MB IDE Hard Disk Drive  
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 Resolution Mode: 1280 X 1024 TIGA Adapter  
 Display: 20" Color Monitor  
 Keyboard: 101-key  
 Mouse: Three-button  
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- ☐ DECpc i486 and i486sx based systems
- ☐ The DECpc 320P Notebook
- ☐ The Catalog

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## Customization Worksheet

Your base system is a: ☐ 286 ☐ 386 ☐ 486 ☐ Other

How many applications will your PC(s) run in a typical workday? \_\_\_\_\_

What best describes the type of work the system will be used for?  
(Check all that apply)

- |  |   |  |
|--|---|--|
| <input type="checkbox"/> Word Processing           | <input type="checkbox"/> Desktop Publishing         | <input type="checkbox"/> Scientific Research                                   |
| <input type="checkbox"/> Order-entry               | <input type="checkbox"/> Education                  | <input type="checkbox"/> Software Development                                  |
| <input type="checkbox"/> Database (filing records) | <input type="checkbox"/> Design (CAD/CAM)           | <input type="checkbox"/> E-Mail  |
| <input type="checkbox"/> Financial Calculations    | <input type="checkbox"/> Engineering                | <input type="checkbox"/> Other industry-specific applications (please specify) |
| <input type="checkbox"/> Retail Store Management   | <input type="checkbox"/> Industrial Process Control |  |

How many people work in your group, department or small business?

☐ Less than 10 ☐ 10-20 ☐ 20-35 ☐ More

Is your operating system:

☐ DOS ☐ DOS with Windows ☐ OS/2 ☐ MAC ☐ UNIX<sup>TM</sup> ☐ Other

Which of the following graphics-oriented applications best describes your needs?  
(Check all that apply)

- |   |  |  |
|---|--|--|
| <input type="checkbox"/> Desktop Publishing | <input type="checkbox"/> Realtime Modeling | <input type="checkbox"/> AutoCad           |
| <input type="checkbox"/> CAD/CAM            | <input type="checkbox"/> Animation         | <input type="checkbox"/> Business Graphics |
|   | <input type="checkbox"/> Image Processing  |  |

## LAN Communication

How many PCs do you have installed? \_\_\_\_\_ From how many manufacturers? \_\_\_\_\_

What kinds of connections does your PC(s) require? (Check all that apply)

- ☐ Links with other PCs in the immediate surroundings
- ☐ Connection to the local area network (LAN) throughout a building
- ☐ A line to a host system in a remote location

What kind of media (cable) is used in your LANs today? \_\_\_\_\_

What is the networking software now being used in your company? \_\_\_\_\_

What kind of host system will your PC communicate with?

☐ DECpc ☐ IBM ☐ Other \_\_\_\_\_

## What Kind of Service Do You Really Need?

- ☐ On-site Hardware Support ☐ Software Support ☐ Telephone Support
- ☐ Training ☐ FAX Hotline

How many of your users take portables on the road? \_\_\_\_\_

Do you currently have a service contract(s) for your PCs? How many? \_\_\_\_\_

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# DEC gear keeps score on majors for STATS

*Statistics firm's IS operations calculate major league baseball data in every imaginable category*

BY THOMAS HOFFMAN  
CW STAFF

LINCOLNWOOD, Ill. — The Major League Baseball (MLB) season may just be getting under way, but STATS, Inc. — which provides statistics and box score information for The Associated Press, *USA Today*, ESPN and several big-league clubs — is already in midseason form with its information systems operations.

Indeed, springtime is the busiest season for the privately held, 10-year-old company. To help facilitate the influx of data sent in daily from the company's 200 to 300 field reporters, who gather statistics on every pitch thrown during MLB's 162-game campaign, the firm recently installed a Digital Equipment Corp. MicroVAX 3100 Model 80 minicomputer to run a 250M-byte database. STATS' shop, which also consists of a MicroVAX II and three MicroVAX 3100s, is linked under a local-area VAXcluster via Ethernet.

According to STATS Vice

President Arthur Ashley, the Model 80 will process the bulk of its information by the end of April. He said the Model 80 was chosen to handle the lion's share of STATS' data processing needs in order to provide information for its reporters and the two fantasy leagues the company manages: The Bill James Fantasy Baseball League — with more than 2,000 subscribers at \$89 a clip — and the STATS Fantasy Football League.

"We're going to have 12 teams in each Bill James league, trades, free-agent drafts, minor league and major league player reassignments and lots of database searches, so we needed a system that was very I/O-intensive," Ashley said.

## Easy access

The statistics are managed by a CompuServe, Inc.'s Data Technologies System 1032 integrated fourth-generation language relational database management system, which Ashley said fantasy league subscribers can access

using a personal computer and a modem.

According to Ashley, STATS usually assigns three reporters to gather the statistics for each

other two reporters generally work at home using other laptops while watching the game on television. The reporters use PlayBall, a software package



Wide World Photos

**Fast pitch:** Baseball statistics tracker STATS will win big this season with its DEC Model 80 gathering data quickly for clients

MLB game. One reporter works in the press box at the stadium using a Toshiba America Information Systems, Inc. T-1000 notebook computer, while the

that STATS developed in-house, to catalog their statistics.

After the reporters have submitted their statistics at the end of each game, STATS compares

and contrasts the information using another program developed in-house called Gdiff, or game differences. Ashley said STATS can provide MLB teams, the news services and its fantasy league subscribers with statistics on any aspect of a game or a player's history.

"We produce reports every week for teams that will tell them that, for example, Ryne Sandberg is currently batting .287 with men on second and third base," Ashley said.

## A negotiation must

Ashley said these reports are in particularly strong demand during players' salary arbitration hearings and free-agent contract negotiations.

The only technologies STATS is currently considering are high-speed laser printers that will enable the firm to print fantasy league reports at 17 page/min. instead of the 4 to 6 page/min. capabilities of its current band printers.

Besides, with the season under way, he's simply too busy to consider further upgrades. "If we had a little time, we would look into other technologies that could help our expansion and DP demands," Ashley said.

## NEW PRODUCTS

### Processors

Dataram Corp. has announced expansion memory for the Digital Equipment Corp. VAX 4000 Model 500 computer system.

Capacities of 32M, 64M and 128M bytes per expansion board are offered. Pricing starts at \$13,400.

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08543  
(609) 799-0071

### Applications packages

System Support Products, Inc. has announced the availability of DeskWorks Release 3.0 for IBM midrange computers.

DeskWorks is an interactive spreadsheet program that runs on IBM Application System/400 and System/32, 34, 36 and 38 platforms.

The new release features a new interface for managing spreadsheets, a description form that is stored with each spreadsheet, record-locking capability and other data integrity features.

The one-time license fee is \$495.

**System Support Products**  
7620 Arlen St.  
Annandale, Va. 22003  
(703) 642-8760

System Software Associates, Inc. has revised its Business

Planning and Control System (BPCS) distribution and logistics software package for IBM Application System/400 computers.

BPCS Version 3.0 features improved coordination of multinational operations. Enhanced capabilities include the following: sales order management, fulfillment and deployment, sales analysis, procurement and replenishment, and financial control and analysis.

Pricing for BPCS 3.0 applications ranges from \$3,000 to \$90,000 based on the AS/400 model.

**System Software Associates**  
Suite 3200  
500 W. Madison Ave.  
Chicago, Ill. 60606  
(312) 641-2900

### Data storage



**VRC's K2-3000 DSSI disk drive offers more than 600 I/O operations per second**

Vermont Research Corp. (VRC) has announced the availability of a solid-state disk drive for Digital Equipment Corp. systems.

The K2-3000 DSSI drive achieves more than 600 I/O op-

erations per second, according to VRC.

Pricing ranges from \$11,940 for a 32M-byte system to \$206,010 for a 1G-byte system.

**Vermont Research**  
Precision Park  
N. Springfield, Vt. 05150  
(802) 886-2256

Aquidneck Systems International, Inc. has announced Gigapage Release 2.0.

Gigapage is a software package that runs on mainframes and works in conjunction with the company's Optical Archiving System Model 3590 mass storage system.

The new version of the Gigapage software features enhanced system administration capabilities, allowing users to define new reports and monitor and tune CICS performance.

Pricing begins at \$150,000 for a complete storage system. Capacities range from 36G bytes to 1 terabyte.

**Aquidneck Systems**  
650 Ten Rod Road  
N. Kingstown, R.I. 02852  
(401) 295-2691

### Utilities

IGES Data Analysis, Inc. has announced Version 2.0 of IGLeaf.

IGLeaf allows users to import computer-aided design drawings into Interleaf technical publishing systems. New functions in the upgrade include full support for Interleaf 5, ellipse generation, automatic document sizing, batch mode processing to generate multiple frames of views and

drawings as well as updated font specifications.

The product runs on Unix and VMS systems as well as personal computers. Pricing starts at \$995 for a single floating license.

**IGES Data Analysis**  
5670 McDermott Drive  
Berkeley, Ill. 60163  
(708) 449-3430

Goal Systems International, Inc. has announced the availability of OPS/MVS Version 2 Release 2.

The new version replaces the OPS/REXX interpreter with the Goal REXX interpreter, a Systems Application Architecture-compliant compiler.

The OPSLOG browser feature now supports multiple filter specifications and allows users to specify that certain messages be deleted from OPSLOG.

An optional component, Systemview/E, is also offered with the new release. Systemview/E monitors and controls MVS and related subsystems in real time.

Pricing for OPS/MVS ranges from \$9,950 to \$79,900.  
**Goal Systems International**  
7965 N. High St.  
Columbus, Ohio 43235  
(614) 888-1775

Advanced Systems Concepts, Inc. has introduced Version 3.2 of the External Performance Simulation System (EPSS) for Digital Equipment Corp. VAX systems.

EPSS tests VAX performance by recording user sessions and then replaying them under a number of scenarios defined by the systems administra-

tor. It reports the response time of the system under each scenario. According to the company, EPSS helps ensure that system response times will be acceptable when the system is reconfigured.

EPSS is a layered product of the company's Performance Simulation System (PSS). The cost of PSS ranges from \$2,000 to \$30,000; EPSS is priced from \$1,500 to \$25,000.

**Advanced Systems Concepts**  
33-41 Newark St.  
Hoboken, N.J. 07030  
(201) 798-6400

Syntax Systems Ltd. has announced the availability of Application Manager for the IBM Application System/400 platform.

The software product replaces traditional menus with windows. Up to four menus can be overlaid on a single display; options can be selected by cursor, key words or standard numeric choice.

The Application Manager screen can be invoked from within other applications without closing the active program. This feature allows users to draw information from several applications at once by hot-key switching back and forth.

Several levels of security are included. The new product also includes an on-line calendar and notebook for each user.

Pricing starts at \$750.  
**Syntax Systems**  
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# APPLICATION DEVELOPMENT

CASE • LANGUAGES • TOOLS

## Information Builders delays Hiperfocus 2.0 to add features

BY THOMAS HOFFMAN  
CW STAFF

NEW YORK — When Information Builders, Inc. introduced Hiperfocus, a new, high-performance version of its Focus fourth-generation language (4GL) software in January, company executives said a second release would be coming this month. Now, they have acknowledged that Release 2.0 will be delayed until year's end so the firm can build in more features.

"Through our [2.0] beta program, we learned there are addi-

tional features users want to see," said Peter Kruskopf, Focus product manager for Information Builders. For example, Kruskopf said a forthcoming feature aimed at supporting IBM's VSAM will be an MVS monitor, which takes a "snapshot" of MVS storage to see if the system is loaded or not.

### Better I/O capabilities

Hiperfocus 2.0 will also incorporate a fast-load facility to improve on existing I/O capabilities while enabling users to lock/load their files. Release 2.0 will also

include an external sort package and enhancements to Hiperfocus' internal sorting algorithms. Price increases will be minimal, Kruskopf said.

Hiperfocus currently requires a base Focus license, with prices ranging from \$13,300 to \$22,000, depending on system configuration.

The 4GL product, targeted at IBM mainframe users running MVS/ESA, was codeveloped by IBM and Information Builders for Focus users who run large numbers of batch processing jobs. According to Kruskopf, Hi-

perfocus users have been able to reduce elapsed time by 20% to 30% by running batch reports on the new release, especially overnight batch reporting.

### Speeds up batch reports

For example, Allen-Bradley Co., the Milwaukee electronic controls manufacturer, has been testing Hiperfocus Release 1.0 since early December. Carla Haines, who works in program support at Allen-Bradley, said the software, running under MVS/ESA on an IBM Enterprise System/9000 Model 720 mainframe, makes batch reports run in a fraction of the time of reports written in on-line Focus. "Hiperfocus cuts your I/O practically down to nothing," Haines said, "and the clock time is reduced drastically, so there's a big advantage, since we do a lot of

batch processing at night."

Despite the breakthroughs in clock speed, Haines is having trouble with Hiperfocus' interactive capability, which she says "chews up a lot of data space." However, Haines said she expects to resolve this problem with either IBM or Information Builders, and she still may purchase the software.

"I can't imagine not adding Hiperfocus if you're a Focus user," said Jeff Tash, president of Database Decisions, a Newton, Mass., consultancy. Tash said he believes the biggest value customers receive by using Hiperfocus is the mechanism that allows users to use Hiperfocus, an IBM facility that permits large volumes of data to be moved directly into the CPU and thus save the time required to fetch data from disk drives.

## U.S. Air Force's CASE plans spur Ada renaissance

BY KIM S. NASH  
CW STAFF

It is not exactly a peace dividend, but the Department of Defense (DOD)-mandated Ada language is enjoying a resurgence of user interest as a result of U.S. Air Force plans to get into computer-aided software engineering (CASE).

Vendors, including Informix Corp. and Sequoia Systems, Inc., recently trotted out new or upgraded products in response to an Air Force CASE initiative.

The DOD declared in June 1989 that Ada must be used — when it is cost-effective — on DOD projects.

"Ada can save money, especially over time, because it promotes software reuse," said Dave Dikel, vice president at Applied Expertise, Inc., an Ada service provider in Arlington, Va.

### Safe, objectlike package

Among Ada's most effective features, according to Dikel, are the following:

- **The package concept.** Ada was designed for modular software development.
- **Almost objectlike.** A programmer or designer can tie several functions together into a neat, reusable package.
- **Safe computing.** Dikel said Ada includes elements of a software-building environment — not just a language — such as a set of rules for maintaining system integrity by prohibiting programmers from taking undocumented shortcuts.

Sequoia announced a new Ada compiler late last month, just a few days before the Air Force hosted a conference for prospec-

tive vendors for a large integrated CASE project scheduled to begin this year.

Meridian Software Systems, Inc. in Irvine, Calif., built the product for Sequoia's Unix-based multiprocessing lines. Sequoia will sell the Ada tool for \$50,000, which covers the compiler, a source-level symbolic debugger, a code optimizer and other utilities, according to a spokesman for the Marlboro,

Mass.-based company.

Government business accounted for approximately 20% of Sequoia's 1991 revenue of \$38.6 million.

### Fitting SQL to Ada

Informix recently unveiled Informix-Ada/Same, which provides extensions to SQL that were designed to improve the query language's fit with programs written in Ada. The tool, the price of

which was unavailable, is targeted at programmers designing custom relational database applications, according to Jackie Lawrence, director at Informix Federal Group in Washington, D.C. Ada/Same is compatible with Informix ESQL Ada, another set of SQL extensions, the firm said.

At least two companies have already met with salutes from the Air Force. The Santa Cruz Operation (SCO) and Aetech,

Inc. said their new XAda programming environment has been formally accepted by the armed forces unit for use on systems under the Air Force Desktop III contract.

XAda, available immediately, lets Ada developers create X Window System-based graphical applications for the SCO Unix System V/386 Release 3.2 operating system, SCO officials said. The new product includes a compiler, a debugger, design and documentation tools as well as a set of X libraries.

## Bachman rolls out CASE tool for workgroups

BY SALLY CUSACK  
CW STAFF

BOSTON — Bachman Information Systems, Inc. announced new products and across-the-board enhancements for its computer-aided software engineering (CASE) tools in Boston last week at its third international user group conference.

One of the most significant announcements was the introduction of the Bachman/Shared Work Manager, a CASE workgroup product designed to resolve conflicts that arise in a multiuser environment.

The Shared Work Manager allows multiple analysts to work concurrently on an enterprise model in parallel, rather than in the more traditional linear method, the vendor said. It does that by allowing subsets of the model to be distributed among analysts, with each being able to see how changes affect the entire

model. The product also provides sophisticated versioning.

Dennis Barham, assistant director of MIS at Cigna, a division of Connecticut General Life Insurance Co. in Hartford, said the firm has been working closely with Bachman on the product almost since its inception.

"We are an IBM DB2 shop, and this allows our database administrators to deliver the product much faster," Barham said.

Cigna is using the Shared Work Manager to simplify and consolidate data dictionary models up to the divisional level.

According to Charles Bachman, chairman and founder of the Burlington, Mass.-based software company, Shared Work Manager contrasts with the traditional interference avoidance method currently available in the CASE product community.

"We are dealing with design transactions that take perhaps hours to complete, and a user

cannot be locked out for that amount of time," Bachman said.

Shared Work Manager is an OS/2-based product that runs on a stand-alone personal workstation or a local-area network. It allows the user to go through a reconciliation process based on an understanding of a specific

counts payable, personnel or payroll — and merge these subjects back into one updated model via facilities provided in the Shared Work Manager.

The Shared Work Manager program is fully integrated with Bachman's existing modeling environment and is priced at \$5,000 per single use license.

Also debuting last week was the company's much enhanced version of its Designer product. The product, which originally was limited to generating SQL queries, has been expanded to allow users to forward-engineer business models created in the Bachman/Analyst into the code generation through IBM's External Source Format.

For existing customers, Bachman/Designer 4.1 costs \$2,500 until June 30 and \$5,000 thereafter. New customers can purchase Version 4.1 for \$7,500 before June 30 and \$10,000 afterward.

Also announced last week was the Bachman/DBA Enabler for capturing and generating IBM SQL/DS for database on IBM VM and VSE systems.

All the announced products are set to ship in June 1992.



Bachman's firm offers a way to design in parallel

business problem.

For example, users can work on specific areas of an integrated business model — such as ac-



## COMMENTARY

William M. Smith

CASE works,  
but not alone

The discrepancy between fact and fiction surrounding computer-aided software engineering (CASE)

is renowned, but it has not inhibited a rapid growth in the sales of CASE tools.

Between 1988 and 1990, CASE sales increased by 70%, from \$161 million to \$270 million. This growth exceeded even the robust 46% increase in total software sales for the same period.

Just the possibility of improving the quality and productivity of software development was enough for many organizations to spend billions of dollars on immature technology. The results of this experiment are starting to be reported, and, like other aspects of the software industry, the facts and the fiction

**C**ASE TOOLS BY themselves do not lead to increased productivity.

are about equally distributed.

The fact is that CASE can significantly improve the quality of software and the productivity of developing and maintaining software. The fiction is that it can do so alone.

In one of the most comprehensive surveys of CASE users to date, Sentry Market Research reported a few months ago that 97% of sites that were happy with their CASE tools could demonstrate improvements in maintenance efforts. This compared with only 28% of those who were unhappy with their tools. In addition, 56% of the sites that were happy with their tools reported improvements in user satisfaction.

This data is encouraging because it demonstrates that all of the money spent on CASE can be used to build quality systems in a productive way.

There were significant differences in the approaches used to implement CASE by the satisfied and dissatisfied sites. A close look at these differences reveals that the benefits of CASE do not come without training, methodology and project management.

In almost all cases, the sites that were happy with CASE approached implementation in

four significant ways:

- They invested more in software and people than in hardware.
- They involved end users with CASE output.
- By a 3-to-1 margin, they used a methodology to control the tool.
- They made a greater effort to quantify and measure benefits.

These differences indicate

that CASE tools by themselves do not lead to increased productivity and higher quality systems. The tools simply facilitate the use of structured techniques.

It is the technique, not the tool, that significantly improves the reliability of user-defined requirements and results in greater satisfaction when the system is finally delivered. Users

need to be trained in these techniques so they can clearly articulate requirements.

Finally, the uncontrolled use of CASE tools — without a methodology to define deliverables across the life cycle, along with a process for controlling the production of deliverables — results in misdirected projects that can degenerate into a “paralysis of analysis.”

CASE tools are intriguing devices that can captivate analysts. However, without a methodology that keeps the project focused and on track, these captivating devices can turn fact into fiction.

Smith is a management consultant at Deloitte & Touche in Philadelphia. He specializes in managing the systems development life cycle.







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## NEW PRODUCTS

**Computer-aided software engineering**

OpenSelect CASE, a line of low-cost computer-aided software engineering (CASE) tools, has been released by Meridian Software Systems, Inc.

OpenSelect Starter (\$195), an introductory single-user CASE tool, is based on a data dictionary. It supports interactive rules, consistency checking, multiple output forms and multiple diagrams.

OpenSelect DOS (\$795) adds multiuser and multiple project support. It provides an interface

to high-end CASE tools from other vendors.

**Meridian Software Systems**  
10 Pasteur St.  
Irvine, Calif. 92718  
(714) 727-0700

Axiom Information Consulting, Inc. has updated its Axiom Information Methodology (AIM) product.

AIM provides a framework

for implementing computer-aided software engineering technology. Version 2.0 updates the three existing phases — Information Strategy Planning, Business Area Analysis and Business Systems Design — and adds a fourth phase: Business Systems Implementation.

The price is \$75,000 for all four phases. It runs under IBM's OS/2.

**Axiom Information Consulting**  
Suite 1190  
120 Montgomery St.  
San Francisco, Calif. 94104  
(415) 398-3484

Iconix Software Engineering, Inc. has announced multimedia capabilities for its Iconix PowerTools computer-aided software engineering (CASE) products.

The technology, called vCASE, provides support for high-bandwidth video and sound information in PowerTools CASE models. The product is implemented in the Iconix PowerTools multiuser dictionary.

Each PowerTools multiuser module is priced at \$995.

**Iconix**  
Suite 320  
2800 28th St.  
Santa Monica, Calif. 90405  
(310) 458-0092

**Compilers**

MetaWare, Inc. and Phar Lap Software, Inc. have announced a software package bundling the MetaWare Globally Optimizing 32-bit High C/C++ Compiler and Phar Lap's 386/DOS Extender.

The combined offering allows developers to build large protected-mode applications that access all memory available in a personal computer.

The package is priced at \$995.

**MetaWare**  
2161 Delaware Ave.  
Santa Cruz, Calif. 95060  
(408) 429-6382

**Development tools**

The Software Business Unit of Solbourne Computer, Inc. has announced the User Interface Builder (UIB) for X Window-based C++ applications.

Developers can use UIB to create graphical user interfaces that are dynamically switchable between OSF/Motif and Open Look. This allows end users to select whichever interface they prefer at runtime.

The price of \$2,995 includes the company's Object Interface Library.

**Solbourne Computer**  
Software Business Unit  
1900 Pike Road  
Longmont, Colo. 80501  
(303) 772-3400

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# EXECUTIVE REPORT

## EUROPEAN NETWORKING

# Europe ho!

*U.S. firms are rushing into Europe in droves, but building networks on The Continent takes more than a little pioneer spirit*



Reinhold Spiegler

**Prudential's O'Neill:** *dramatically revamping international telecommunications will speed up worldwide information flow*

BY ALICE LAPLANTE  
AND JOSEPH MAGLITTA

**T**homas Loane, vice president of computers and communications at Alamo Rent-a-Car, Inc., is Europe-bound. "We are just putting in a network on The Continent for a number of smaller sales offices," says Loane, who will be setting up telecommunications links with new European business partners for the Fort Lauderdale, Fla.-based chain. "We need to be able to begin designing and engineering the network as soon as the ink is dry."

"This," he predicts, "is not going to be simple."

Loane is no pessimist. Major technological and legal barriers await U.S. firms seeking to build or expand networks in the unifying Europe. Chief among them are the following obstacles:

- Unreliable and inconsistent telecommunications services between individual countries and cities.
- Conflicting standards for everything from electronic data interchange to modems.
- Monopolistic, government-controlled carriers that limit vendor service and equipment options.
- Unpredictable installation and service "turn-on" target dates.
- Widely varying government regulations and tariff structures.

LaPlante is a free-lance writer based in Palo Alto, Calif. Maglitta is a *Computerworld* senior editor, executive report/integration strategies.

**MAJOR LEGAL AND technological barriers await U.S. firms seeking to build or expand networks in the unifying Europe.**

Some plan to open European plants and offices. Others will acquire European companies, merge or start a joint venture. More than half will expand current distribution arrangements, the study found.

Regardless of the approach, information systems will play a key role. Senior IS managers are already spearheading many projects, including enhancing and expanding existing networks, building new IS teams and telecommunications centers and integrating new subsidiaries' systems into the parent architecture.

Despite the many obstacles, the EC networking news is not all bad: After years of strict monopoly on voice and data traffic, many countries are inviting competition from Postal Telephone and Telegraph (PTT) authorities.

Analysts also say that reforms sweeping European telecommunications, including relaxed regulations, should mean more open markets and better quality services. This means firms can build sophisticated networks never before possible.

Prudential Securities, Inc., for example, will over

the next two months dramatically revamp its international telecommunications architecture, including Europe. "We realized we could save a significant amount of dollars by combining our two existing networks," explains Bernie O'Neill, a first vice president at Prudential. Besides cost savings, flexibility and improved employee productivity are major goals, he adds.

Prudential currently has two disparate networks. One allows branch offices to communicate

*Continued on page 78*



### Networking in Europe

#### KEY POINTS

► Major roadblocks facing U.S. firms expanding in Europe include spotty telecom service, utility monopolies and unpredictable "turn-on" dates.

► Multinational companies must navigate a confusing, competing array of national guidelines for data security and privacy.

► Despite ongoing efforts, many technical standards such as ISDN vary from country to country (see story page 80).

► Encouraging signs include increased competition among telephone companies and the growth of ISDN and VANs.

► After networks are connected, IS must cope with big nontechnical issues, including language barriers and different business practices (see story page 81).

► Outsourcing international networks has become popular with many companies lacking time, experience, interest or qualifications to build European networks (see story page 79).

#### QUOTABLE:

*"This is not going to be simple."*

Thomas Loane  
Alamo Rent-a-Car



# Tips for innocents abroad

► **Think European.** "To presume that setting up networks in Europe is the same as in the U.S. is courting disaster," warns Thomas Loane, vice president of computers and communications at Alamo Rent-a-Car, Inc.

► **Be realistic.** In many countries, not even packet switching is available. Thus, information systems planners must recommend alternatives that can be used by network designers. "It's essential to be pragmatic and to deal with current reality as opposed to potential," says D. J. Crane, vice president at GE Information Services.

► **Be flexible.** You might not be able to build a network from a single type of service, such as all switched or private lines, so you'll need to devise multi-service plans that vary from country to country, says Len Elfenbein, president of Lynx Technologies, Inc., a telecommunications consultancy.

► **Be more flexible.** Depending on the country, leased lines, dial-up lines, packet switching and data circuit might be the best deal. "In the UK, packet switching might make more sense, and in France, dial-up lines might be the most economical," says David Flint, a managing associate at CSC/Index, Inc. in London.

► **Plan time loosely.** "You must be very careful in setting time frames for telecommunications services," cautions Bernie O'Neill, a first vice president at Prudential Securities, Inc. And don't rely on vendor or government promises, he adds. "Something that's supposed to happen next month could be delayed until next year, and you can end up in a real bind."

► **Check equipment.** A terminal approved for use in France, for instance, is not necessarily approved in Germany or Denmark. "You need to check that the equipment you want to use is approved," advises Colin Sorrill, president of GRS Co., a British consultancy.

► **Survey the landscape.** When designing a network architecture, check local conditions before putting plans in place.

► **Check coverage areas.** If you're considering outsourcing your network, make sure the vendor has the right connections in the specific country and city.

# Building networks in Europe takes more than a little pioneer spirit

CONTINUED FROM PAGE 77

over 9.6K bit/sec. lines to a London hub, which in turn connects to New York over a T1 line.

The second network was installed and maintained in London by the British news agency Reuters Ltd. It provides Prudential's European offices with quote information and exchange rates via leased terminals and propriety software — at hefty fees.

To combine the networks, Prudential will put point-to-point 64K bit/sec. circuits in each branch. Local databases in each

as the UK is a virtual free-for-all. "Local knowledge is extremely important because these markets were protected for so long," Sorrill says.

Until deregulation becomes widespread, U.S. firms must also be ready to deal with monopolies. CSC's Flint says some may be shocked at the relationships between private European PTTs and government regulators. To American sensibilities, he says, these tight links "amount to a conflict of interest."

city to city. In established centers such as central London, Paris or Frankfurt, Sorrill says, the quality of the service is as good as you'll get anywhere. But "if you want to put plants in Greece or Portugal or southern Spain, the chance of any network service at all is quite remote," he adds.

Most public data networks in Europe offer on-demand, usage-based data communications supporting X.25 and asynchronous transmission. Some also support synchronous and IBM 3270 protocols.

## Staking claims

A key decision companies fending for themselves must make is where to locate their European telecommunications nerve center. "Many countries have recognized the importance of attracting large corporate network centers to their countries," says Len Elfenbein, president of Lynx Technologies, Inc., a telecommunications consulting firm based in Little Falls, N.J.

Best choices differ. Prudential, for instance, chose London. "We have about 600 people in our London operations," Neill says. "We've traditionally had good results with our UK and U.S. broadband international links, which we have split between Mercury and British Telecom."

But no matter where you choose to locate, consultants and IS managers say, you should expect high networking costs.

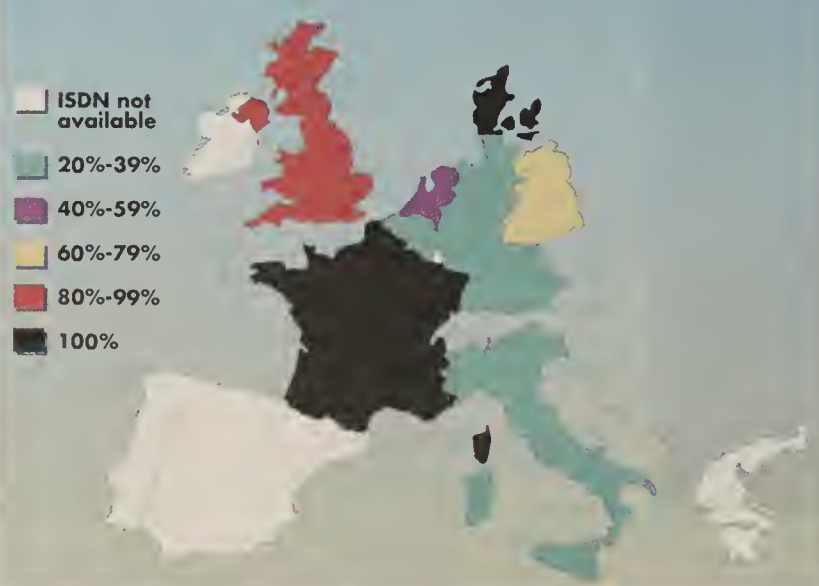
"In the UK, for example, a general rule of thumb is that communications will cost you about four times what it costs in the U.S.," Alamo's Loane says. "On The Continent, multiply your U.S. costs eight times, and you'll have a reasonable estimate."

In countries with monopolies, service remains expensive, though Elfenbein notes that Eu-

**A** VAILABILITY and quality of telecom services can vary tremendously from country to country — even from city to city.

## Who's got ISDN?

Availability of commercial basic access varies from 100% in France to near zero in Greece



Source: Ovum Ltd.

CW Chart: Michael Siggins

location will be updated in real time via a broadcast satellite. London will remain a telecommunications hub through a front-end remote processor that will serve as the interface to host network facilities in New York.

The unified network, O'Neill says, will give Prudential traders immediate access to market information, exchange rates and relevant news from the New York headquarters. It will also give branch locations access to home office software.

## Headaches, headaches

Because of the many potential headaches, a growing number of U.S. firms expanding into Europe are outsourcing some or all of their European telecommunications operations (see story page 79).

Firms that choose to fend for themselves face several challenges. For starters, just keeping track of activity in each country is a major task. "The rate at which countries have moved toward deregulating their telecom industries has varied widely," notes Colin Sorrill, president of GRS Co., a telecommunications consulting firm based in Chorleywood, England.

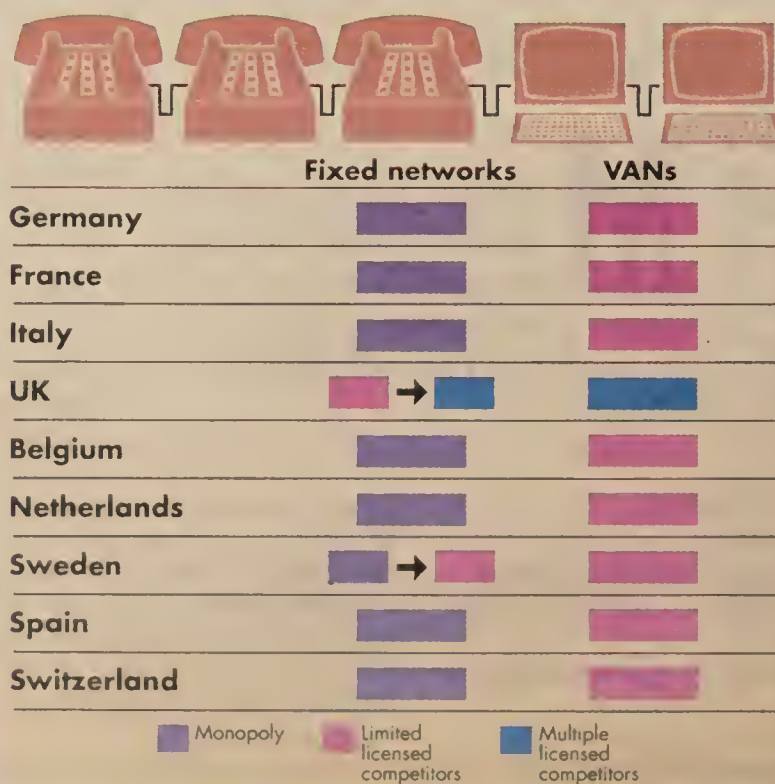
For instance, deregulation in Switzerland and Belgium is going very slowly, Sorrill says, where-

Alamo's Loane is more blunt: "In some European countries, you are lucky to have even two vendors to choose from."

Another problem is spotty services. Availability and quality can vary tremendously from country to country — even from

## Regulatory scorecard

Though more competition exists in VANs, most EC members still have monopolies on fixed networks



Source: Frost and Sullivan, Inc.

CW Chart: Guy Stuart

ropean carriers can quickly adjust their tariffs to sell particular services.

Another challenge facing U.S. firms expanding in Europe is planning a realistic network architecture. Consultants and IS managers say lack of uniform services in Europe makes planning architecture difficult.

Some are moving cautiously. Sonoco Products Co. in Hartsville, S.C., has not begun formulating an international telecommunications strategy for its manufacturing facilities in seven Western European nations.

However, over the last six months, that has changed, says Bernie Campbell, vice president of corporate information services. "There has been a growing consensus that there needs to be a corporate direction," he says. Right now, most communications between Sonoco locations is via fax or direct dialing from one processor to another.

"We don't want to put the cart before the horse," Campbell says. A final decision — aided by consultants and telecommunications vendors — will be made after the issues and conditions of individual markets are better understood, he explains.

In contrast, the promise of huge cost savings drove Rockwell International Corp. to adopt a global telecommunications strategy in 1986. It has worked out well, says James Sutter, vice president and general manager.

## Changing landscape

Even as U.S. companies adapt to the new Europe, the telecommunications landscape is changing.

A recent study by Ovum Ltd., a London-based research firm, predicts a rapid rise in the availability of commercial Integrated Services Digital Network basic and primary access between now and 1996 (see chart this page).

Also expected to grow in popularity are virtual private networks (VPN). These are broadband, logical, closed user groups implemented on public switched networks. Instead of using



dedicated leased lines to convey intercompany calls, the network is programmed to identify, route and charge those calls.

In addition, plans are racing ahead for an EC-wide system of common networks slated to open in 1994. Also actively working is Ebone, a consortium of 35 groups — including regional networks, universities and laboratories — dedicated to creating an open, value-added, multiprotocol network.

Many U.S. multinationals are also pressuring their carriers to offer the service internationally. By 1995, researchers expect a drop in international leased lines for data and a switch to VPNs (see chart below).

Private and governmental telecommunications organiza-

tions are rushing into strategic partnerships and alliances to provide global services and one-stop shopping.

Roberta Wiggins, a senior analyst at The Yankee Group in Boston, warns against taking these announced alliances too seriously. "Not all these joint efforts are going to come to fruition," she says.

But don't hold your breath. "European carriers," Lynx's Elfenbein notes, "have been striving to develop common technical standards, common pricing and common service levels. But history has taught us that process can take decades."

Until then, U.S.-based IS managers must continue to keep pioneering, just as New World explorers did in years past. •

### Virtual progress

*As the decade progresses, data flow on virtual private networks (VPN) is expected to increase both nationally and internationally*

	National	International
1991-92	<ul style="list-style-type: none"> <li>• Virtually no service available.</li> <li>• Telecom companies focus on voice.</li> </ul>	<ul style="list-style-type: none"> <li>• Very limited 64K bit/sec. service.</li> <li>• Telecom companies focus on voice.</li> </ul>
1993-94	<ul style="list-style-type: none"> <li>• 64K bit/sec. service in major business centers.</li> <li>• Customer premises equipment becoming available.</li> <li>• Users remain skeptical about security, reliability.</li> </ul>	<ul style="list-style-type: none"> <li>• 64K bit/sec. service more available.</li> <li>• Many data applications move to VPN.</li> </ul>
1995-on	<ul style="list-style-type: none"> <li>• Higher than 64K bit/sec. and broadband available.</li> <li>• User worries overcome.</li> <li>• Prices fall.</li> </ul>	<ul style="list-style-type: none"> <li>• Services higher than 64K bit/sec. available.</li> <li>• International leased lines for data recede.</li> <li>• International data applications proliferate.</li> </ul>

Source: Ovum Ltd.

CW Chart: Michael Siggins

## Got a problem? Ask the members of SITA

Wayne Hannah decided that the smartest way to link up globally was to sign up.

Hannah, manager of network communications at McDonnell Douglas Corp. in St. Louis, figured out an alternative to building a private global network or hiring a networking outsourcer.

McDonnell Douglas tackled the problem by becoming a member of Societe Internationale de Telecommunications Aeronautiques (SITA), a not-for-profit, airline-affiliated consortium that develops worldwide networks.

Founded in 1949 by 11 airlines, SITA now has 440 member companies. Besides its telecommunications network, SITA operates two data centers. The network links 31,000 airline and travel-related offices in 187 countries and territories. It is staffed by 3,300 members in 30 information centers.

The benefit for members, says Gerald Sturman, SITA's group manager for aerospace, is that SITA is familiar with problems that companies expanding abroad are likely to encounter.

A good example is how the agency helps companies transplant expatriates to overseas locations. "SITA recruits indigenous technicians and management personnel that know the customs, speak the language and understand how to work with the PTTs," Sturman explains.

User groups work with SITA to determine how services should be developed and operated. System enhancements are subject to approval by subscribers.

Sturman says SITA members sit on standards-setting committees and then implement the standards in the network.

# U.S. companies find outsourcing a sensible way to go international

BY ALICE LAPLANTE

Just as a good tour guide can make international travel easier, many U.S. companies are hiring third-party vendors to ease their network travels across Europe.

Outsourcing international networks has become a popular option for an increasing number of companies.

For example, J. P. Morgan & Co. recently inked a five-year, \$20 million contract to have BT North America, Inc., the North American arm of British Telecommunications PLC, handle its overseas, terminal-to-host network.

Boston-based Gillette Co. signed a three-year contract with BT North America's Global Network Services for its telecommunications operations in 180 countries.

Network outsourcing holds great appeal for companies lacking the time, experience, qualifications or desire to set up networks in strange lands.

"We're in the food business," says Harry Wallaesa, vice president of MIS at Campbell Soup Co. in Camden, N.J. "I'm not interested in becoming an expert on pan-European telecommunications."

Campbell Soup is currently negotiating a possible outsourcing contract with AT&T to help with the "constantly changing" international network, Wallaesa says. "We're interested in the help they can provide dealing with the various regulatory bodies and monopolistic entities," he says. Campbell has international operations in the UK, France, Belgium, Italy, the Netherlands and Germany.

### Needed: Local smarts

"Local know-how is absolutely essential," agrees Alex Lee, director of electronic data processing at Chicago-based Hyatt International Corp.

The overseas arm of Hyatt Hotels Corp. — which has properties in Belgrade, Yugoslavia; Cologne, Germany; London; and Madrid and will open one in France this year — outsourced its European telecommunications operations five years ago.

Lee says Hyatt hired InfoNet Services Corp., the El Segundo, Calif.-based telecommunications firm, rather than tackling the intricacies of building its own international network.

However, some information systems managers caution against signing long network outsourcing contracts in a fast-changing European market.

"Long-term outsourcing contracts are dangerous," says Thomas Loane, vice president of

computers and communications at Alamo Rent-a-Car, Inc.

"If you think you know what your business requirements in Europe are going to be four or five years down the road, I think you're fooling yourself," Loane adds.

Even so, the Fort Lauderdale, Fla.-based chain is looking at outsourcing European telecommunications.

Lee warns of gaps in service, a problem that can plague all of

sive international operations, says James Sutter, vice president and general manager. Although each Rockwell business unit sets its own IS strategies and agendas, telecommunications is handled by a 90-person staff in California.

"We'd like our individual businesses to take advantages of the backbone infrastructure for cost reasons," Sutter says. "We procure the routers and contract with the major carriers in order



**Rockwell's Sutter** claims tighter control is possible when U.S. staff oversees service on backbone infrastructure

European telecommunications. "For instance, although InfoNet has a very good presence in Germany, they don't have it in the city of Cologne, where our hotel is based," he says. "So we had to deal with the local PTT to make sure we had a connection from Cologne to the nearest city that InfoNet served."

Prudential Securities, Inc. chose to do its telecommunications redesign and implementation in-house. The reason, according to Bernie O'Neill, a first vice president at Prudential, is control. "We like the control and the ability to handle things ourselves if anything happens."

### Greater control possible

Ironically, improved control can also be a good reason to outsource networks.

"At best, the U.S. telecom manager has dotted-line responsibilities for overseas IS and often doesn't want to see independent telecom bureaucracies developing," notes Len Elfenbein, president of Lynx Technologies, Inc., a telecommunications consulting firm based in Little Falls, N.J.

The next best thing to having direct U.S. control, Elfenbein says, is ensuring that IS at least has vendor control of overseas operations.

That's the case at Rockwell International Corp. in Seal Beach, Calif., which has exten-

to bring the costs down."

For companies that do opt to outsource networks, it's imperative to get a solid contract, says Roberta Wiggins, a senior analyst at The Yankee Group in Boston.

In fact, putting service-level and quality guarantees into contracts is an important new trend in international telecommunications outsourcing contracts and has replaced cost as the top concern, Wiggins says.

Peter Cook, manager of BT North America's Global Network Services, says, "In many cases, we reduce the cost of setting up a private network or buying a patchwork quilt of services from different PTTs by nearly half," thanks to bulk buying.

As expected, the global network outsourcing market is crowded with hopeful vendors. AT&T, MCI Communications Corp., U.S. Sprint Communications Co., British Telecom, Cable & Wireless PLC and France Telecom, as well as the Deutsche Bundesposte in Germany, are seen as most likely to survive.

In addition, IBM last fall introduced a network consulting service for large users called Net-Review International.

Aimed at traditional systems integrators, the service will, among other things, handle network outsourcing, according to the company.



# Patchwork of laws slows EC data flow

BY LESLIE GOFF

When Sonoco Products Co. wanted to relocate a French plant, company officials found that it involved more than moving 10 miles across the Belgian border.

Besides the prohibitive cost of running a dedicated line from the local-area network between the plants, the Hartsville, S.C.-based recycling and packaging company discovered that French law prohibited it from transferring employee files across national borders.

As John Petrush, a strategic consultant at Sonoco, learned: "There is no consistently defined standard across all 12 EC nations."

Welcome to the New Europe, where expanding U.S. companies are encountering data protection and security regulations that often are far stricter than laws in the U.S. Moreover, because regulations for European Community (EC)-wide information flow are still being hotly debated, multinational companies often find themselves confronting a confusing, competing array of national guidelines.

As a result, companies expanding in Europe must sort through local laws to determine which and to where data can and cannot be transferred. Information systems managers and consultants say this reality makes compliance with data privacy laws a nightmare and places responsibility squarely with the individual companies.

Even network service providers cannot shoulder the entire load. "We provide a highway for getting from one network to another," says Glenn Kowac, chief executive at Amsterdam-based EUnet, the

largest subscription-based research network in Europe.

Keeping on top of that responsibility can be a major headache. Sonoco, for example, has a large presence in the UK and France, as well as smaller operations in Norway, Germany, Spain, the Netherlands and Belgium. It has plans to expand into Italy and Eastern Europe.

While the company sees advantages in a transcontinental network, officials have decided that the headaches associated

see standardized national approaches for data collection, storage, processing, transport and access as essential to the formation of a single European market.

## Much ado about something

Concern about cross-border data transfer and security in Europe dates back to the early 1980s. However, dialogue has reached a fever pitch recently.

In February, the EC approved \$15 million in funding to create a commission that would study risk analysis, standardization and evaluation of computerized systems for the next two years. Guidelines called "The Information Technology Security Criteria for EC Members" were published last June by a group led by France, Germany, the Netherlands and the UK.

Debate on information access and security issues dominated last month's Securicom conference in Paris. More than 200 lobbying groups proposed amendments, says Pierre-Alain Weill of France's Commission for Information Technology and Liberty. Some want more protection; others want less.

Laws proposed by the EC Commission would require each EC member state to adhere to the directive through local legislation. EC sources expect a final decision on

the legislation later this year. Actual implementation and compliance with the directive could still take years, however.

## Talk still taboo

Despite the volume of dialogue, security issues remain a sensitive subject in much of Europe today. In fact, many companies will not discuss on the record accountabil-

ity for misuse, loss, destruction, unauthorized access of personal and corporate data and other related matters.

One big reason is a proposed article within the draft legislation now under review by the EC Commission that could hold individuals liable for security breaches in electronic files. Member states would determine what sanctions and/or fines offenders would face.

Alain Brun, a principal administrator within the EC Commission, says a big question mark is whether responsibility rests with a company or its IS manager. "It's probably an individual," Brun says.

Analysts say that one result could be greater regulation of IS professionals in Europe. Some go so far as to predict that IS could be subject to licensing and certification like accountants, doctors and lawyers.

"The organization no longer is solely being held responsible for irresponsible behavior," says Sanford Sherizen, president of Data Security Systems, Inc., a Natick, Mass.-based computer security consultancy and author of a new book on international security issues relating to the EC Directive. "The door has been opened."

Sherizen adds that certification isn't necessarily bad; it also provides legal protection for IS, he notes.

Liability issues become even more unclear unless a network is operated by a third party. Is the service provider or the client company liable? Is it an individual within one or both of those parties? The EC's draft legislation is not explicit but suggests that both sides — the network provider and the subscriber — share responsibility.

John Guinasso, director of operations support and network security at BT North America, Inc., which operates a public data network, argues that subscribing companies must share responsibility for data security. Users, he says, must determine what data is sent, to where and to whom.

"We can provide sophisticated security," Guinasso says, "but there are conditions where someone might be using an authorized user name and password in an unauthorized way. That's where the responsibility is shared."

## Global standards sought

Even when Europeanwide security guidelines are adopted, which EC leaders acknowledge will take years, many predict that the need for international networking standards will intensify.

"We can't do a good job on security unless we think of it as an international issue," says Mike DeFazio, chairman of the Information Technology Association of America (ITAA) Computer and Network Security Committee.

For example, a single standard for electronic data interchange (EDI) for European and U.S. companies will be required, says DeFazio, an executive vice president at AT&T's Unix System Laboratories in Summit, N.J.

The ITAA last month recommended the formation of an International Information Security Foundation. Its goal, DeFazio says, would be to encourage world governments to develop international data security standards.

"Governments can't operate in the vacuum of their own country. It has to be a global effort," DeFazio says. •



Roger Ball

**Sonoco's Campbell** opts to process data locally because of uncertainties with cross-border data flow

with tracking cross-border data flow are too great. For now, they'll continue to manage data within national borders.

"Our preference is to have local data processed locally," says Bernie Campbell, vice president of corporate information services at Sonoco.

The issue is far from just an arcane legal wrangle among nations. EC ministers

# Handling standards that aren't standards

In Europe, computing and communications "standards" have dialects, too.

Despite earnest EC efforts, many standards such as ISDN vary slightly from country to country, IS managers and vendors report. "For example, all PTTs offer X.25," says Peter Cook, manager at BT North America, Inc.'s Global Network Services. "But the implementation is likely to be slightly different in each country."

Nonstandard standards can be an especially big problem for U.S. firms trying to set up links with trading partners via EDI. The EC has endorsed EDifact as the European EDI standard. But many European firms still use industry-specific EDI standards, which conflict yet again with the U.S. standard, ANSI X12.

"We're still using many industry-specific standards, particularly in our automotive components business," says James Sutter, vice president and general manager at Rockwell International Corp.

However, the aerospace maker is keeping an eye open as various industry groups migrate to EDifact, Sutter adds.

Pete Tannenwald, a manager at Andersen Consulting's Network Solutions Practice in Chicago, says that EDifact is less advanced than ANSI X12. "However, most U.S. firms

using EDI in Europe are tending to use either EDifact or an industry-specific standard," he says.

Tannenwald says some U.S. firms — U.S. automotive manufacturers, for example — are even considering switching over to EDifact completely.

A key point to be considered, he adds, is the "ripple effect" that adopting EDifact will have on EDI trading partners based in the U.S.

Further complicating matters is a United Nations endorsement last year to use Dun & Bradstreet Information Services' Data Universal Number System (DUNS) as a standard worldwide identifier for EDI transactions.

The DUNS number, assigned by D&B, is supposed to speed up transactions and eliminate errors in company identification and location. In addition, the DUNS number can be used to link related businesses and identify companies by location, across industries, across national borders and within their own IS systems.

"Using a DUNS number means a corporation has access to a global family tree of any company in the world," says Dick Schwarz, senior vice president of central data operations at D&B.

ALICE LAPLANTE

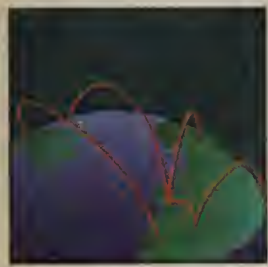
Goff is a New York-based free-lance writer.



# After the network is up, the fun has just begun

BY CANDEE WILDE

If you think your headaches are over once your European network is up and running, sit down and pour yourself a nice glass of schnapps. Experts say you'll need it.



"If the technology issues are viewed as the size of a marble," says Cory Van Wolve-laere, a partner at the Network Solutions arm of Andersen Consulting in Chicago, "then the overall business integration issues are the size of a basketball."

Indeed, information systems managers and consultants warn that cultural and language issues are often far more challenging than simply setting up technology.

## Drawbacks

From conducting a multinational business meeting to working with a government-run phone company on a network problem, experienced hands say doing almost anything in Europe inevitably takes longer and costs more than in the U.S.

Following is a brief rundown of some major operating issues for IS in Europe:

• **Differing business practices and currencies.** Setting up systems for different currencies and reporting methods can be a major challenge.

Varied business practices and definitions (such as what constitutes a "finished" product) and numerous inventory and ordering methods, to name a few, can make life tough for IS, says Carl Wilson, senior vice president of management in-

formation services at Grand Metropolitan PLC.

The Minneapolis-based food and international retailing business operates seven locations in Europe.

Most multinational companies are working hard to address the specific problems of international communications, Wilson says, but technology is limited. "Few software packages are truly international in scope."

For now, Grand Metropolitan is developing global communications with available software such as Soft-Switch, Inc.'s electronic-mail package.

United Technologies Corp. in Hartford, Conn., spent two years developing and implementing an integrated, worldwide Consolidation and Reporting System (CARS), according to United Technologies spokesman Matt Nozzolio.

CARS gives 3,000 international users a common tool and methodology to collect, analyze, report and distribute financial and operating data.

Built using Micro Control, Inc.'s IMRS software, finance and IS managers worked with worldwide managers to build a system used in more than 100 countries by more than 3,000 people, including accountants, financial planners, managers



Atre says political rifts over standards are even fiercer in multinationals

and senior executives.

Completed in 1990, the project eliminated 13 redundant mainframe applications, Nozzolio says.

• **Managing remote networks.** Many American companies mistakenly assume they can run an international network from the U.S., Wolve-laere says. In reality, solid local support is needed, he adds, which means that IS managers had better be ready to compromise.

Wolve-laere says the best way to avoid problems with differing languages or business practices is to recruit local support to manage remote points of the network.

• **Creating international standards.** Developing a consensus on standards is tricky in the U.S. and triply so overseas because it requires worldwide buy-in.

As in domestic projects, European and other overseas divisions or departments can often become very protective of data and reporting methods, says Shaku Atre, president of Atré, Inc., a Rye, N.Y.-based consultancy.

"Trying to put together standards in a large company is almost impossible because there is so much politics," she says.

Grand Metropolitan is working internally to develop its own standards for reporting information and is moving toward

Unix-based open systems to support newly developed applications at all locations.

To best the problem, Grand Metropolitan is picking only packages and solutions based on Posix and general industry protocols, Wilson says.

• **Working with national telephone companies.** Building solid relationships with local Postal Telephone and Telegraph (PTT) authorities is key, says Robert Jarecki, director of international information services at American Cyanamid Co. in Wayne, N.J.

PTTs can be frustrating for a U.S. company, Jarecki says, particularly as several PTT representatives are often assigned to different aspects of its network.

Finally, IS managers should not assume they will have the same leverage with a PTT — which is basically a monopoly — as they do with competitive U.S. carriers.

• **Handling language barriers.** Hiring bilingual European nationals is a good way to help ensure the success of international networks.

At Sterling Winthrop, Inc., the New York-based pharmaceutical company, foreign offices must collect and consolidate divisional information and send it to the U.S. — in English.

Because financial staffers are bilingual, says Doug Falconer, director of international MIS, "it isn't a problem."

Others aren't so lucky. One consultant recalls spending 45 minutes in a meeting listening to U.S. headquarters staffers and European engineers argue over a network problem, only to discover that both sides were using different terminology to suggest the same solution.

Wilde is a free-lance writer based in Easton, Conn.

## AT&T moves into Pan-European network market

▶ AT&T is jumping into the fray of network operators scrambling to construct pan-European, high-speed corporate data networks. AT&T recently launched its Accunet network to compete against British Telecommunications PLC's Syn-cordia consortium and Cable & Wireless PLC in the UK. Two types of services are planned: a private line service called Accunet Digital Services and a second build around X.25 data transmission technology. The company says clients will be able to use Accunet's management and administration capabilities from one central European location.



## Just dial 00

▶ The European Commission plans to put a common dialing code in place by the end of this year. The new international code will be 00 for most countries, including Belgium, Germany, Greece, Italy and Portugal. Other nations — Denmark, France and Spain — will not be required to make the code changes until 1998.

## Teleconnecting financially

▶ International telecommunications carriers from 12 countries formed the Financial Network Association (FNA). Incorporated in Belgium last month, the FNA will provide global voice, data and video services to the financial industry worldwide. Service is expected to become available in the second and third quarters of this year. The U.S. member is MCI Communications Corp. Others include Australia, Belgium, Canada, France, Germany, Hong Kong, Italy, Japan, Singapore, Spain and the UK.

## InfoNet to widen service

▶ InfoNet Services Corp. plans to unveil frame-relay service on three continents in October. Nodes in Western Europe, North America and Hong Kong will give InfoNet the broadest reach of any frame-relay provider. InfoLAN/FR will let users link scattered local-area networks using protocols such as Transmission Control Protocol/Internet Protocol. Speeds will range from 56K to 1.54M bit/sec. or T1 in the U.S. In Europe, the range is 64K to 2.048M bit/sec. or E1.

## Hungary moves to privatize

▶ The government has taken steps to privatize state-owned Hungarian Telecommunications Co. over the next three years. A consultant to oversee the complex process is expected to be chosen by mid-May. An estimated \$10.2 billion will be needed between now and 2000 for Hungary's telecommunications network to reach Western European standards for data transmission and other value-added services.

## For the truly brave, try Eastern Europe

Tough as it is, setting up networks in Western Europe is child's play compared to doing it in Eastern Europe.

IS managers and international telecommunications experts say old and primitive systems can make even the simplest data and voice communications a real hassle — and a gamble.

"U.S. companies — which aren't facing the best of times financially — face a lot of start-up aggravations and sunken costs before realizing any benefits," says Seymour Goodman, a professor of MIS and policy at the University of Arizona in Tucson.

Still, U.S. firms seem undeterred. Since the Berlin Wall fell in November 1989, about 43% of U.S. companies have sent representatives to Eastern Europe to investigate potential markets, according to a recent KPMG Peat Marwick survey.

Before U.S. business is willing to commit, however, telecommunications in Eastern Europe will need a

drastic overhaul, experts agree.

"This is going to cost billions, and at this point, it's unclear who is going to pay for it," Goodman says. "Most of these countries have very little money, and so they are trying to work out what deals they can with Western and Japanese companies."

One standout is Hungary, which is seen as doing a good job encouraging competitors to bid on a solid national system to support voice and data.

Eastern Germany is benefiting from the economic and technical support of Western Germany.

According to a recent Dun & Bradstreet study, the number of phone lines in Eastern Germany will climb from less than 700,000 today to 1.25 million in 1994. But experts warn that the effort will cost the state telephone monopoly so much that other telecommunications issues in Germany may be ignored.

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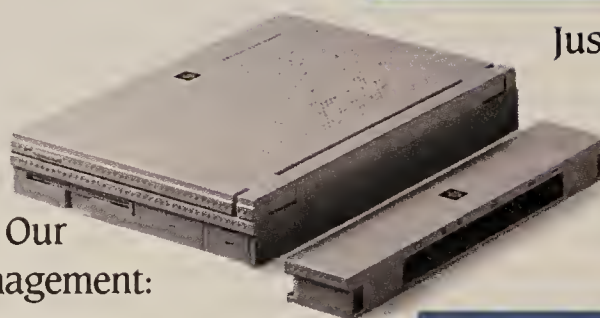


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## The one that got away

*Three case studies reveal that 'soft' factors such as poor management and political chicanery can derail the best-intentioned software projects*

BY PAUL WINSBERG  
AND DANIEL RICHARDS

**W**hat causes a software project to crash and burn? Most information systems managers correctly pinpoint the usual suspects: inadequate budget planning, unrealistic schedules and technology problems such as poor design, incorrect programming language, wrong hardware platform or lack of computer-aided software engineering (CASE) tools.

However, these very same managers oftentimes overlook the "soft" causes of a software fiasco: namely, bad management and political maneuverings (usurping power, empire-building or failure to build consensus). These "project killers" can be every bit as insidious as more commonly recognized troublemakers. With that realization in mind, IS chiefs can increase the chance that their software projects will be successful.

The following are three studies of bungled software projects at three large U.S. organizations. The situations are real, but the company names are fictitious — the organizations requested confidentiality in all cases, for obvious reasons.

These studies are based on interviews with key project members and illustrate how bad management and politics adversely affect the outcome of a software project.

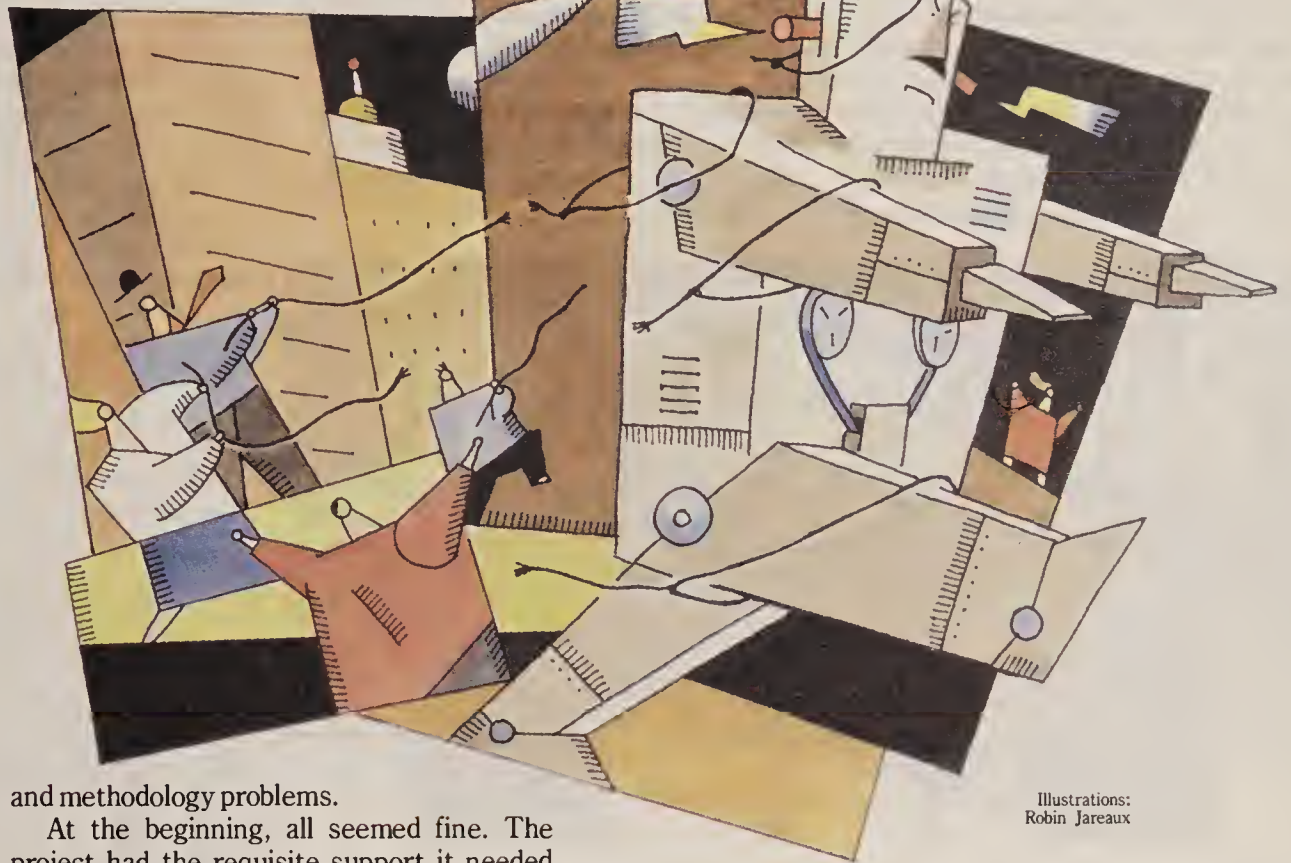
### *The Case of the Engineered Fiasco*

Global Engineering is one of the world's largest engineering firms, specializing in nuclear reactors, oil refineries and civil and structural engineering projects.

In 1982, the company's business was booming. It had expanded considerably in 10 years, and its global staff numbered 22,000. It felt that its existing, separate financial management systems — with their prob-

lems of redundant data entry, inconsistent data and cumbersome operation — just didn't fit in with the company's plans. What did fit in was an integrated financial system that tied together payroll and labor distribution, contract management, billing, operations and financial reporting, general ledger and accounts payable.

However, this lofty system vision has yet to come about, undermined by poor management, politics and, to a lesser extent, technology



Illustrations:  
Robin Jareaux

and methodology problems.

At the beginning, all seemed fine. The project had the requisite support it needed — the chief executive officer and end users liked the idea, and in fact, the chief financial officer was the project's sponsor. Furthermore, IS would use the standard life cycle techniques of the day, including structured analysis and data flow diagrams.

But the management philosophy at Global soon got in the way. The management philosophy at the firm is that on any job site, the project manager is supreme, responsible for ensuring that the project is delivered on schedule and within budget. As the head of the financial system effort, the CFO was in complete control. Unfortunately, he had no prior experience as a manager on a system development project.

The CFO's first order of business was to put the financial system on an IBM platform, even though Global was a Burroughs Corp. (now Unisys Corp.) shop. The centralized IS staff resisted this move because it was concerned about the additional effort and training required to support applications on multiple platforms. It also sensed that this was an

attempt by the CFO to usurp its power. Unwilling to negotiate with technical staff regarding the switch to IBM, the CFO instead worked around the IS staff in planning, developing and implementing the system.

He purchased an IBM mainframe and hired new development staffers, independent of IS. At the height of the project, the CFO had on his payroll 350 developers, 60% of whom were hired as Global employees and 40% of whom were outside contractors. The IS empire he formed (which paralleled the central IS group) included data administration and quality assurance groups.

The CFO set the project budget at \$25  
*Continued on page 84*

Winsberg is a principal at DataBase Associates located in Berkeley, Calif., where he specializes in database design and implementation. Richards is a consultant affiliated with DataBase Associates, specializing in requirements definition and data/process modeling. The two co-authored an article on this subject for the Winter 1991/1992 issue of *InfoDB*.

- **Cases: Engineering, freight, accounting firms**
- **What a postmortem can do for you**
- **Getting a handle on project estimates**



Continued from page 83

million and the schedule at three years; however, the plan was not sufficiently detailed. It only extended to the subsystem level, not the module level, and had no built-in review or revision periods to ensure that the project was conforming to budget and schedule.

In fact, because of this "imperial" management style, lower level developers, analysts and first-line management never reviewed the schedule or committed to it.

Without checkpoints that provided a complete picture of spending and progress, costs trebled to \$75 million, and the schedule stretched to five years.

The CFO tried to control mounting costs and slipping schedules by increasing staff. (The logic here is that if one woman can deliver a baby in nine months, then nine women can deliver a baby in one month.) At one point, the team worked three shifts, seven days a week, but productivity did not increase with staff size. Developers kept running into each other.

Morale and productivity began to sag when the CFO fired the data administration and quality assurance groups.

The data administration procedures were too slow and bureaucratic (it took one week and multiple forms to get a committee to OK adding data elements to the centralized data dictionary). Poor management had resulted in the hiring of qual-

ity assurance staffers not very familiar with software development. The group emphasized format, such as spelling errors, rather than content.

Unfortunately, these firings added to project costs because the accumulated knowledge was lost.

Compounding the serious management gaffes were significant, but not fatal, technical problems. Because personal computers had become popular during the course of the project, the company had to delay development six months to bring in PCs.

In addition, because of poor capacity planning, the IBM 3030 mainframe ordered at the project's start caused unacceptable response times during development; 10-minute delays were typical. In order not to overload the system, the team had to split into shifts, which adversely affected team morale as well as the flow of communication. Ultimately, the company had to purchase a more powerful 3080-class machine.

In 1987, two years later and \$50 million more than expected, a scaled-down 3080-based system was installed in five sites across the country. To this day, only general ledger, accounts payable and billing components are in use.

### Global postmortem

Global's main problems were as follows:

►The project manager had no prior system development experience.

►Global greatly underestimated the effort initially and failed to periodically review and revise estimates. Underestimating schedules is extremely common, occurring in more than 90% of all software projects. The majority of schedule overruns are in the 10% to 50% range. But it is not unheard of for projects to run up to 100% or occasionally even 200% over schedule.

►Procedures for data administration and quality assurance were bureaucratic and cumbersome.

►Requirements and technology advanced faster than system development. Today's IS managers must consider not only changes at the end-user level (graphical user interfaces) but also changes in development approaches, such as the advent of object orientation.

## The Case of the Narrowly Averted Disaster

Cargo Corp. is a large transportation company that moves container freight worldwide via ship, rail and truck. Cargo was one of the first companies to use the stack train, a system of stacking two containers per flat car. Begun as an international cargo shipper, the company added a domestic operation in 1986 and added to its rail-car network with the acquisition of several domestic freight companies.

Cargo undersold the competition with the stack train system and made good profits; consequently, domestic operations grew rapidly.

Cargo was highly decentralized (with a corporate headquarters and various field

operations), and the result of this rapid expansion was chaotic procedures in branch offices and operations centers. Offices set prices independently, invoices were late or inaccurate, and customers were confronted with uncoordinated business practices at different locations.

To present a uniform image to customers as well as to improve logistics by, for example, having an optimal number of stack cars in each part of the country, Cargo decided to develop an integrated freight management system.

The system was installed in the first field office in April 1990 with the last of a dozen offices going on-line in July — one year later than planned. The system was not only late but also 50% over budget.

What went wrong? It wasn't system development or performance problems but organizational and managerial blunders. Specifically, project management failed to seek user participation and commitment or senior management sponsorship, nor did it confirm that business procedures changed along with systems.

The vision for the system at the project's inception in 1988 was that it would consist of six components: pricing; order processing; invoicing; container and shipment tracking; customer access to the status of freight moves; customer profiles with individual shipping requirements; and electronic transfer of invoices and freight orders. Corporate also wanted a change in Cargo's business practices to support the idea of a single

point of contact for inquiries, central price setting and uniform billing and payment policies. Field offices would be consolidated.

Corporate pushed for the new computer system and new business practices. However, users in the field offices, who



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## Pointers on postmortems

*Done right, they encourage staffs to improve*

One of the most valuable but neglected paths to improving the development process is the postmortem. Performing a postmortem on a failed project is like watching the game film of a lost football game — not fun but the only way to profit from mistakes.

Despite the value of after-project analyses, managers rarely conduct postmortems. They hide mistakes rather than evaluate and publicize them; it is human nature to put a failed project in the closet. But postmortems can help encourage staffs to monitor and improve the development process. Staffers will be more alert to early warning signs of failure.

The most important thing to remember is that postmortems are not witch-hunts. The focus is on the process, not the people. If you want a well-rounded analysis, you should acknowledge the good as well as the bad.

Postmortems should take place right away while the events are still fresh and key individuals still accessible. Typically done by a member of the project team or an internal quality assurance group, a postmortem begins

by identifying why the project failed. This will direct subsequent efforts.

For example, if the system is plagued by serious performance problems, you'll likely want to look at technical design. But if the system failed to meet user requirements, your initial focus may concentrate on analysis.

Interviewing team members is an important part of getting to the heart of what went wrong. Go beyond project management to meet with technical staff and users. Individual interviews are best for honesty (remember to assure the participants that individual comments will not be attributed).

However, group interviews can be efficient and stimulate discussion, as long as you separate managers from staffers. It may even be worthwhile to talk to project staffers who have left the company. However, beware the disgruntled employee.

Finally, postmortem work doesn't stop when you've discovered what went wrong. Make specific recommendations. Think of nonobvious areas such as more training, proper staffing, improved development tools/methods and changed management practices.



## Break projects into manageable parts to improve estimates

**E**stimating a project's cost and duration is one element of project management that is particularly difficult in software development efforts. For example, all three of our case studies exceeded their original budget and schedule by at least 100%.

Why are software estimates consistently low? Project managers often commit to firm dates early in the project life cycle, when much is unknown. Optimistic schedules are the result of little detailed knowledge of requirements, political pressure and the human instinct to deliver only the good news.

Because of the extraordinary complexity of software systems, the estimation process must be disciplined and rigorous. An iterative approach in which requirements are broken down into smaller components can be helpful. An estimate is reliable only when each component is of a manageable size and when managers and developers have committed to cost and duration for each component.

Early in the life cycle, ranges are preferable to precise numbers; the range should include a component for undefined work. As the project matures, the range narrows and the undefined work component decreases.

In addition, estimates must include contingency factors, which take into account unanticipated roadblocks.

were not involved in the planning, resisted. The rapid expansion had them scrambling just to keep their heads above water. They did not relish any disruptions and viewed the project as a bitter pill pushed down their throats.

Therefore, the field offices adopted few new business practices before the computer systems were introduced.

This political and management problem was compounded by the geographic separation of field users and corporate developers and turnover in corporate management. New management did not take ownership of the project and failed to reinforce its importance. Whatever minimal support there was in the field dissolved.

In the first months after installation, users pointed out every hiccup as proof that the system was flawed. Word of the intense dissatisfaction got back to corporate management, which began to question the project and investigate commercial packages as replacements. The system was nearly abandoned.

But the system was saved from the scrap heap after six months by IS' intense promotion and education — efforts the staff admittedly should have undertaken earlier in the project life cycle.

IS launched a promotional campaign. Technical staff traveled to field offices and brought field management to headquarters. They were open about outstanding problems and encouraged user participation. Many opponents of the new system were unfamiliar with its functions, so IS held frequent demonstrations.

In time, developers and users formed a team. Today, there is a backlog of requests for enhancements, and field offices are sponsoring their own quality and process improvement initiatives.

### Cargo postmortem

Users can make a mediocre system shine or make a good one fail. The shipping system nearly failed for three reasons:

►Lack of user participation and commitment. This is a common cause of project failure. Education and training are the keys to project acceptance.

The IS department must make deliverables easy to understand. It should ensure that requirements documents are clear and concise. The best way to generate user interest is through prototyping.

►Lack of sponsorship by senior management. Strong sponsorship is essential not

only for development projects but also for any major organizational changes.

►Introduction of computing systems without corresponding business procedures. This ill often befalls computer-aided software development projects. IS frequently introduces CASE tools without properly training software developers and analysts in new software development procedures.

### *The Case of the Deadly Cross Fire*

Big Bucks Consulting is a Big Six accounting firm. The organization is highly structured, and great authority and privilege are vested in the partners.

In 1982, \$2 billion Big Bucks had a number of aging systems in need of replacement, particularly its general ledger and client billing systems. As of today, Big Bucks still hasn't replaced those systems because of faulty project leadership.

Big Bucks wanted new general ledger and billing systems for several reasons:

- To generate client invoices faster.
- To improve analysis and reporting functions at branch offices.
- To consolidate domestic and international general ledger.
- To streamline maintenance and enhancements.

The general ledger and billing project had a high profile — its sponsor was the CFO, and users included office and division managing partners. The general ledger system was estimated to take nine developers nine months. The billing system, developed in parallel, was a smaller project with a staff of 12. Both systems were to operate on new Wang Laboratories, Inc. minicomputers.

Big Bucks' first mistake was selecting two project leaders: the partner in charge of information systems, who would handle general ledger, and a consulting partner from the Detroit office to direct the billing project. Split leadership is always risky business, and in this case, clashing personalities made matters worse. While the Detroit partner was a strong decision maker, he was also aggressive and authoritarian, using threats to spur work. The IS partner was diplomatic, skilled at building project teams and familiar with existing financial systems.

Each partner recruited a separate project

team. The Detroit partner called in Big Bucks consultants from the field. These staffers were young and accustomed to receiving unquestioning acceptance of their technical work because they dealt with inexperienced, external clients. The IS partner recruited staffers from his group who tended to be older and more seasoned than the consultants.

These cultural differences magnified the predicament of split management, and a rift formed between the two groups.

The team-building problem was compounded by the development methodology. The team planned to install a complete system all at once rather than incrementally developing and installing components. Incremental development is helpful in that it alerts the project sponsor to structural problems early in the schedule.

The Detroit partner soon dominated his associate and expanded his domain to the general ledger project. He loaded the general ledger project with developers from his team, and the number of developers ballooned to 40. Instead of using the IS group's knowledge of general ledger, much of which was relevant to the new system, the Detroit team gathered its own requirements from regional offices around the world.

The project expanded to 18 months and went 400% over budget. Although the CFO was the project sponsor, software

development was not his priority, and he did not intervene as the work unraveled.

The Detroit manager eventually reached out to IS, but it was too late.

Eighteen months into the project, the CFO was fired. The IS partner retired early for health reasons, the Detroit partner was sent back to his home office, and three project managers received severance packages.

The new CFO froze development and called in an assessment team. The project was never revived, and 10 years later, the old general ledger and billing systems are still active.

### Big Bucks postmortem

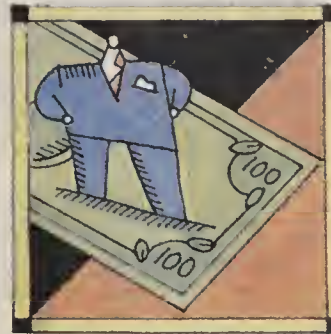
In hindsight, the fatal problems were obvious

and related to the management structure from the start:

►Split project leadership. Dual leadership is not very common. However, if it happens, clearly define each leader's responsibilities in order to avoid problems.

►A disinterested project sponsor. Nothing hurts a project faster than a project sponsor who lacks the necessary motivation to provide a serious level of support.

►A project leader lacking in team-building skills and business-area knowledge. An extremely common problem, an unqualified leader is hindered by the inability to build strong teams, motivate individuals or resolve conflicts. •



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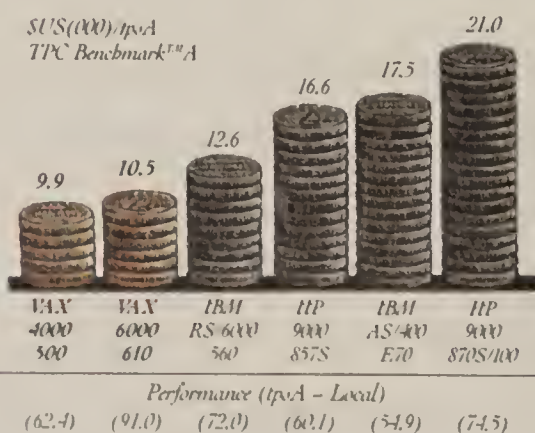
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## IN BRIEF

### SIM mulls policy stance

■ The Society for Information Management (SIM) is considering a possible stand on the need for a national education policy to promote computer literacy. At the recent SIM Institutional Member Conference in West Palm Beach, Fla., a small group of SIM members met to discuss how the organization could become an advocate to promote computer literacy in U.S. schools.

Chicago-based SIM is considering positions on several issues, including vendors' software licensing policies [CW, April 6]. Official positions must be voted on by SIM's board of directors and its full membership.

■ SIM announced several speakers for its 1992 annual conference, to be held Oct. 18-21 in Los Angeles. The conference theme is competing through technology, and the event will feature sessions on shorter cycle times, leaner organizations and new markets.

Speakers include Peter Drucker, management professor at Claremont University; James Wetherbe, director of the MIS Research Center at the University of Minnesota; Gideon Gartner, chief executive officer of Gartner Group, Inc.; and Susan Swenson, president and chief operating officer of Pacific Tele-sis' PacTel Cellular business.

■ IS consulting services company Comp-u-Staff, following its acquisition by Adia Services, Inc., has changed its name to Adia Information Technologies. The Towson, Md.-based firm provides management consulting, applications development and systems programming services to U.S. corporations and government agencies.

#### QUOTE OF NOTE:

"Incrementalism — just focusing on small improvements — is an international disease."

— Nicholas Negroponte, professor of media technology at MIT and founder of the MIT media lab

## Honoring thy messenger, Japan-style

*U.S. firms seek greater success with the Japanese way of integrating the IS function*

BY JOANIE M. WEXLER  
CW STAFF

Corporate America's approach to information management is more fragmented and technology-oriented than that of Japanese businesses, according to a recent Ernst & Young report. But some progressive U.S. organizations, such as the Du Pont Co., are starting to pick up on Japanese information management styles.

Compared with Japan, the U.S. tends to "overemphasize technology and underemphasize information specialists, such as librarians, business analysts and journalists," says Laurence Prusak, a senior manager at Ernst & Young's Center for Information Technology and Strategy in Boston.

His comments are based on a recent Ernst & Young report on information business practices in eight of Japan's largest firms, including Nissan Motor Corp., Nippon Telegraph and Telephone Corp. and Toshiba Corp. (see story page 89). The report, *Information Management and Japanese Success*, suggests that Japan's emphasis on information management — not just technology — has counted heavily in taking the country from ground zero after World War II to the second largest economy on earth.

#### Not just for automation's sake

Du Pont's Michael Emery, who holds the dual positions of senior vice president of information systems and senior vice president of engineering at the global organization, says he plans to apply Japanese-like scrutiny in selecting which business processes his



Michael S. Klein

company automates.

Emery headed up Du Pont's business in North Asia in the early 1980s and visited Japan last December to observe six major companies in the chemical, electronics and manufacturing fields.

"The Japanese are more careful about what they automate," Emery observes. "They simplify their business processes first, then automate only that which makes sense. We could benefit from that in this country. At Du Pont, for example, we do too much automating for automating's sake."

Another U.S. organization that has taken an approach like that of Japan is the Central Intelligence Agency, Pru-

sak says. "The CIA has taken seriously the Japanese concept of building a long tradition of understanding worldwide issues," he says.

However, American business generally hasn't gotten around to presenting and evaluating information in its contextual setting of the whole organization and industry, which would allow firms to better exploit it, he says.

American businesses tend to "grab relevant information of the moment," agrees James Matarazzo, co-author of the Ernst & Young report and a professor at the Simmons College Graduate School in Boston. "Most of us don't understand what role we play in our orga-

*Continued on page 89*

## The great debate: Business or technology first?

BY CLINTON WILDER  
CW STAFF

It wasn't exactly Bill Clinton vs. Jerry Brown, but two teams of leading information systems executives took off the gloves recently to debate: Should the IS chief be the shaper or simply the enabler of business strategy?

The debate took place at the annual Society for Information Management (SIM) Institutional Member Conference in West Palm Beach, Fla.

The "pro-infrastructure" team did not argue for a backroom role for IS but that the IS chief's job is to participate in business strategy while keeping the technology engine running smoothly. "You can't have 11 quarterbacks on the

field; every player has an assigned role," said William Eager, president of the Services Division at First Bancorp of Ohio. "We are not CEOs."

Eager's teammate, Whirlpool Corp. Vice President of Information Technology Richard Koeller, drew an analogy to his boyhood hero, Gen. Douglas MacArthur. "MacArthur was fired by Harry Truman because he overstepped his bounds," Koeller said. "That upset me at first, but after I thought about it, Truman became my new hero."

Although IS executives must fully understand their businesses, Eager and Koeller argued that corporate America is still a long way from placing its IS talent in charge of business strategy. "We must deal with the world as it is, not as we wish it

were," Koeller said.

In rebuttal, Carrier Corp. Vice President of IS John Owens said the IS department's relationship with all aspects of an enterprise makes it the perfect business strategy leader. "No other function has our unique license to cross functional boundaries to drive change," he said.

Owens, the current SIM president, cited IS executive surveys conducted by SIM and CSC Index, Inc. that have rated re-engineering business processes as the top priority. "You could build a great infrastructure that doesn't serve the business," he said. "We don't aspire to run the corporation ourselves, but we do expect to be a member of the team that leads the enterprise."

Eager and Koeller argued that a key role for IS is assuring that information technology is cost-effective, but Owens countered, "The CIO should be driving down the cost of doing business, not just the cost of IS."





## CALENDAR

EDI '92, the fifth annual conference and exhibit hosted by the Data Interchange Standards Association, Inc. (DISA), will be held May 11-13 at the Washington State Convention and Trade Center in Seattle.

The conference includes a spotlight on electronic data interchange management issues and features executives George Fugere of Bethlehem Steel Corp., Ghyrane Davidson of Southwestern Bell and Ralph Szygenda of Texas Instruments, Inc.

To register, contact DISA, Suite 355, 1800 Diagonal Road, Alexandria, Va. 22314 or phone (703) 548-7005.

## APRIL 26-MAY 2

**Computer Audit, Control and Security Conference.** Philadelphia, April 26-May 1 — Contact: EDP Auditors Association/Foundation, Inc., Carol Stream, Ill. (708) 682-1200.

**Focus User Conference.** Dallas, April 26-May 1 — Contact: Rosemary Mauro, FUSE, Inc., Freehold, N.J. (908) 308-9275.

**XWorld.** New York, April 27-30 — Contact: Jennifer Fischer, SIGS Publications Group, New York, N.Y. (212) 274-0640.

**Software Maintenance and Re-engineering.** Chicago, April 27-29 — Contact: Applied Computer Research, Phoenix, Ariz. (602) 995-5929.

**Downsizing/Rightsizing Corporate Computing Conference and Exposition.** Los Angeles, April 27-May 1 — Contact: Boston University Corporate Education Center, Tyngsboro, Mass. (508) 649-4200.

**USE, Inc. Conference.** San Francisco, April 27-May 1 — Contact: Carolyn Abell, USE, Inc., Bladensburg, Md. (301) 699-9336.

**James Mortin World Seminar.** Washington, D.C., April 27-May 1 — Contact: Susan Levine, Extended Intelligence, Inc. Chicago, Ill. (312) 346-7090.

**DecWorld '92.** Boston, April 27-May 15 — Contact: Rogal America, Inc. Newton, Mass. (617) 244-2800.

**Directions and Implications of Advanced Computing Symposium.** Berkeley, Calif., May 2-3 — Contact: Doug Schuler, Seattle, Wash. (206) 865-3832.

## MAY 3-9

**Information Technology Association of America (ITAA) 76th Management Conference.** New Orleans, May 3-6 — Contact: ITAA, Arlington, Va. (703) 284-5333.

**Association for Systems Management's (ASM) 45th Information Systems Conference.** Montreal, May 3-6 — Contact: Terri Gibbons, ASM, Cleveland, Ohio (216) 243-6900.

**Pen-based Computer Conference.** Boston, May 4-5 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3880.

**Eastern Communications Forum '92.** Rye Brook, N.Y., May 4-6 — Contact: Eastern Communications Forum, Chicago, Ill. (312) 938-3500.

**Netcom '92.** Hartford, Conn., May 5-6 — Contact: Daniels Productions, Inc., West Hartford, Conn. (203) 561-3250.

**Dexpo Spring.** Atlanta, May 5-7 — Contact: Miller Freeman Expositions, Boston, Mass. (617) 232-3976.

**Notional On-line Meeting.** Medford, N.J., May 5-7 — Contact: Tom Hogan, Learned Information, Inc., Medford, N.J. (609) 654-6266.

**The Fourth Annual Executive Uniform Symposium.** Santa Barbara, Calif., May 5-7 — Contact: Patricia Seybold's Office Computing Group, Boston, Mass. (617) 742-5200.

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## MAY 10-16

**James Mortin World Seminar.** San Francisco, May 11-15 — Contact: Susan Levine, Extended Intelligence, Inc. (312) 346-7090.

**Electro '92.** Boston, May 12-14 — Contact: Natalie Perlin, Electro '92, Los Angeles, Calif. (310) 215-2976.

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**Government Technology Conference/Western Region.** Sacramento, Calif., May 13-15 — Contact: GMW Communications, Sacramento, Calif. (916) 443-7133.

## MAY 17-23

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**ICA 1992 Expo and Conference.** Atlanta, May 17-21 — Contact: ICA Expo '92 Housing Coordinator, Rogal America, Inc., Newton, Mass. (617) 965-8000.

**Information Engineering Symposium.** Washington, D.C., May 19-21 — Contact: Wilma A. Hurwitz, Technology Transfer Institute, Santa Monica, Calif. (310) 394-8305.



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# Honoring thy messenger, Japan-style

CONTINUED FROM PAGE 87

nization's grand strategy."

DuWayne Peterson, president of DuWayne Peterson Associates in Pasadena, Calif., and Merrill Lynch & Co.'s retired chief information officer, also agrees. "This is definitely an advantage the Japanese have," Peterson says. "The majority of U.S. companies have islands of information that are not optimally used because they're not put in context."

There is also a tendency in major U.S. corporations to designate the top IS executive as the person who determines what information users get — as well as who gets it and in what form, Peterson says. "To me, that is a weakness in any company. The CIO doesn't have enough experience to know what kind of information all people need."

Japanese firms' fundamental ability to integrate corporatewide information stems in large part from the country's tight-knit culture, says Yukichi Otsuka, chief representative of Toyo Information Systems Co., a \$500 million systems integrator in Osaka.

## Cultural differences

"Interpersonal contact is much more frequent than in ordinary U.S. business practice," Otsuka explains. He chalks this up to the Japanese rotational management style and to the fact that an estimated 20% to 50% of new hires in Japanese firms remain at the same company for 25 years or more.

As employees move up the corporate ladder in Japan, they get bumped from division to division "so that by the time someone becomes a general manager, he is familiar with four different divisions and has met four times as many people," Otsuka says. Managers thus gain a better understanding of the business' overall information needs.

Other key Japanese business practices that vary from Western information management styles in the Ernst & Young report include the following:

- Because of information's perceived value to organizations, Japanese firms do not feel they must justify information management expenditures. As an example of the fundamental integration of information with the entire business, Prusak recounts, one Japanese IS professional interviewed said, "I don't have to justify

heating the building, do I?"

Emery, however, says he would disagree with that observation from a technology standpoint. Most of the six firms he met with in December, he says, maintained a fixed budget for IS expenditures: 0.9% of sales.

"I found a much higher accountability for producing a business result in Japan," Emery says. "A project must be started, completed and paid back in three years or it is considered a failure."

- Information management rotates among all company managers every three

to five years, allowing each manager to learn how information is used and valued, as well as the economics of providing it.

## Influence on U.S.

This integrated business approach is seeping into progressive U.S. businesses deploying a matrix style of management under which each executive's success depends on the success of all other business units. Forerunners include Du Pont [CW, Nov. 25, 1991], IBM, 3M Co. and Xerox Corp.

At The Florsheim Shoe Co. in Chicago,

the firm's vice president of finance is taking strides to re-engineer business processes so that information management is more tightly integrated with all functional areas. This should help unseat a perception in the industry that "systems people just want to further their careers with the latest and greatest technology," says Lyle Wilson, vice president of MIS.

IS executives in the U.S. can take steps to spur this integration, Prusak says. He advises them to start building strategic alliances with other informational functions within their firm.

"Deliver a system or product prototype that brings value to your CEO without waiting to be told to do it," he says. "If you wait in this tight economy, it's never going to happen."

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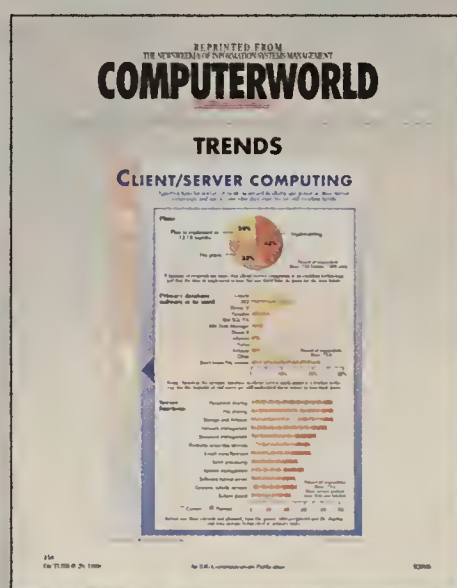
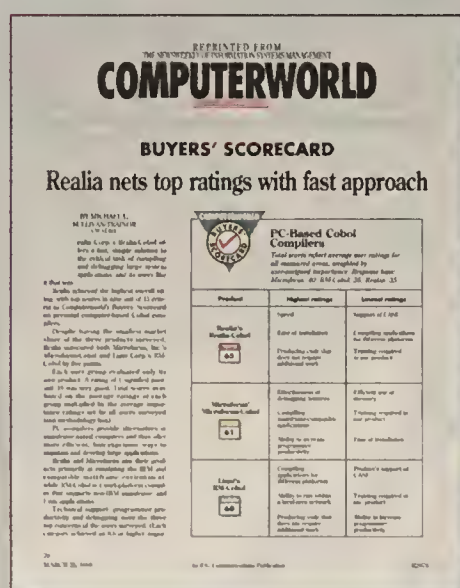


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# COMPUTER CAREERS

## Knowledge engineers blend people skills, programming

BY LESLIE GOFF  
SPECIAL TO CW

If you've ever fantasized about being a psychologist, philosopher, anthropologist or journalist, you may want to consider knowledge engineering as a career.

Basically, knowledge engineers interview experts in a particular subject, then write a program of rules that recreate the approach to the problem.

Financial services, consumer products, transportation, insurance, manufacturing and biomedical industries and government all employ these professionals.

"You probably couldn't find a single field that hasn't had an expert system developed for it," says Julie Walker, executive director of the International Association of Knowledge Engineers in Rockville, Md.

General Motors Corp., for instance, has an expert system dubbed the Dealer Review Advisor, which helps branch credit analysts evaluate car loans.

Walker said the number of knowledge engineers is difficult to quantify. "It's hard to estimate exactly how many there are because so many people are acting

as knowledge engineers but calling themselves something else." But she estimated there are about 50,000 in the U.S. and Canada. That number can be expected to grow "significantly," she said, as traditional programmers continue to adopt knowledge techniques, tools and strategies.

The position requires a range of skills. Besides experience with traditional languages, programming skills in C, LISP or Prolog are desirable. Experience with expert systems shells and object-oriented packages is also a plus.

But perhaps even more important are excellent communications skills. "It's a complex process because you're dealing with human expertise in advanced areas of work," says Henry Rabinowitz, a technical supervisor at Nynex Science and Technology, Inc. in White Plains, N.Y.

Among the specific skills needed are the ability to elicit and distill large volumes of information, sales ability and a knack for anticipating and managing user expectations.

"Other than that, we work like any programmer," Rabinowitz says. "We write the code, deal with integration and communication systems — problems everyone has to face."

For their varied expertise,

knowledge engineers earn more than traditional programmers and systems analysts. Last year entry-level salaries averaged \$39,000, according to Barbara Gibbs, a consultant at Edward Perlin Associates, a New York management and compensation consulting firm.

Pay for experienced knowledge engineers can reach \$80,000 to \$90,000, she says. Consultants earn between \$600 and \$1,200 a day.

The typical project for a knowledge engineer differs from conventional systems development in two major ways: First, the process is highly interactive and involves getting user feedback at every step. Second, the programming focuses on knowledge rather than procedure.

In fact, writing code is only a small part of the average expert systems project. Instead, knowledge engineers focus on extracting information from the "domain" of the expert and modeling it to create an expert solution.

Before the interviewing can begin, however, the knowledge engineer must determine the

best expert to interview.

"Finding the right expert has a lot of subjective aspects to it; there's no formula," Rabinowitz says. "You look for someone you have a good personal chemistry with, someone who has time to talk to you and whose management is willing to let them spend the time on the project."

The initial interviewing is also a subjective process, says Mark Gembicki, director of the emerging technologies division of Telecommunication Systems, Inc. in Annapolis, Md. "You have to be able to react."

After the first two or three interviews, modeling is done. This means graphically representing the links in logic that the domain expert has outlined. At this stage, gaps in logic and knowledge become obvious, and more interviews are done.

The Social Security Administration in Baltimore, for example, began designing a knowledge-based teleservices application for its toll-free information centers by having teams of policy experts and phone representatives create screens of information that they would like to have in a program.

Denis Possing, a senior knowledge engineer at S.C. Johnson & Son, Inc. in Racine, Wis., begins the process with a full-day interview with everyone who will be involved with the application.

A week or so later, he goes

back with a model or specific questions based on the prior session. As modeling begins, Possing starts meeting regularly with the domain expert. These sessions refine the application.

"My questions and interviewing style are flexible, depending on the project," he says. "On some, I've actually taken classes beforehand to get up to speed on the subject. You have to get them talking and draw the process out of them. Generally, we'll go over it a few times, getting more detailed about each step as we go."

The process continues to be interactive throughout the application development phase. The program is tested and tweaked to ensure that it solves problems.

### Handling high hopes

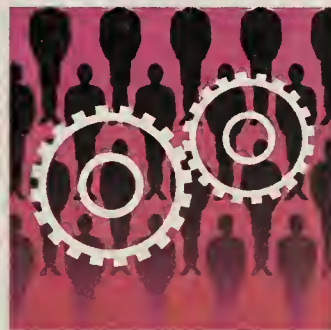
Knowledge engineers say another key part of their job is managing high expectations.

"AI is being promoted as the end-all-be-all, save-the-world technology," which can create problems, Possing notes.

"At first, people are cautious," adds Majid Mokhbary, a senior project engineer at General Motors' advanced engineering/cognitive systems department in Warren, Mich. "But by the end, they expect miracles. They want the expert system the next day with no problems."

To be successful, knowledge engineers must help educate their companies about what expert systems can and cannot do.

Goff is a New York-based free-lance writer.



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# Upward moves take time, work

*Fast Track is a twice-monthly column dedicated to answering questions on career directions. This week's guest adviser is Suzanne F. Fairlie, a certified personnel consultant and president of ProSearch, Inc., an information systems placement firm in Greater Philadelphia.*

**Q** I recently began a job search, but I am only being sent on interviews for jobs equivalent to my present level. When I accepted my current position five years ago, I was given a 20% increase and a promotion. Today, I can only find positions that are the same thing I am doing now. What's wrong?

**A** The job market has been glutted by hundreds of technical people whose firms have downsized or disappeared. As a result, most hiring situations will not result in significant increases of responsibility or salary.

If a department has fewer staff and less time to train, then your training curve becomes more critical. You are more likely to be hired into a lateral position while you learn the firm's methodologies. Once you've been productive in a position for a year, you are more likely to be promoted.

**Q** I am a field service engineer who specializes in the repair of minicomputers. I have about 11 years experience. I survived recent layoffs, but now I feel threatened, so I started to look for another job. Is there still a need for experienced hard-

ware field engineers? If so, where can I find a job?

**A** Check various computer publications' want ads for a good barometer of needs in your field. Salary surveys in such publications can help you determine if you are at the high end of the salary range. Call some of your company's competitors anonymously and ask to speak to the district field service manager to get some insight in your marketplace. Or attend a user group meeting in your particular area and talk to users about their current experiences.

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**A** Because you have a proven track record, a business or management degree will be more valuable to you. Fortune 500 firms typically look for candidates with four-year degrees

from a recognized school and the ability to expand responsibilities in each career move without extensive job-hopping.

**Q** I returned to college for an MIS degree after a 10-year break during which time I worked as a legal secretary and WordPerfect instructor. Now I'm a manager in a law office. I have over 12 years of business experience with progressively increasing responsibility, including extensive personnel supervision and training in book-keeping. How can I get a job in the IS world, and what type of firm would be interested in someone with my skills?

**A** Your knowledge of the law field and its terminology should be attractive to both a vendor who develops and installs legal systems, and a large law firm with an IS staff to develop and support its applications. Consider opportunities to provide training and installation for these application areas. Downplay your secretarial experience and emphasize the applications and hardware you used, the areas you trained others in as well as your knowledge of the legal industry.

*We want to hear from you. Please direct your career questions to Kelly Dwyer, Careers Fast Track, Computerworld, 375 Cochituate Road, Framingham, Mass. 01701, or fax them to (508) 875-8931. If we use your question, we'll send you a gift.*

## JOB SNAPSHOT

### Quality assurance pros

**►JOB REQUIREMENTS:** Quality assurance professionals need to be familiar with the entire software development life cycle. Knowledge of risk assessment is a help, as is statistical process control and project management. While you don't have to be an expert on a particular system or language, you need to know how to optimize processes.

**►BEST EDUCATION:** Managers hiring today want quality assurance professionals to have some kind of a degree, such as computer science, especially if they hire from outside the firm.

**►CAREER PLUSES:** You are typically involved in all projects under way in an organization. This job is well-suited for someone who likes being a facilitator and finding ways to make other people's jobs easier.

**►CAREER MINUSES:** If quality assurance doesn't have strong support in your firm, you may be less a consultant and more a policeman. This tends to build walls and isolation. As such, your career path can be limited.

**►SALARY ESTIMATES:** The Quality Assurance Institute in Orlando, Fla., says the average annual salary for quality assurance managers in 1990 was \$53,054, ranging from \$36,000 to \$110,000; for quality assurance staff, the average salary was \$46,029, ranging from \$24,000 to \$70,000. The reason for the wide range, according to one quality assurance manager, is that in some places, quality assurance is a strategic (high-end) position. In others, it leans more toward quality control and keeping track of metrics (low-end).

**►RECENT CHANGES:** As quality assurance expands, more firms are realizing there's a critical need for examining and improving processes. "Today we can bring into play options we didn't have before — like using a CASE tool, unit testing, concurrent or incremental development, or rapid prototyping," one quality assurance professional says.

**►REAL-WORLD ADVICE:** On the technical side, learn about flowchart analysis and statistical process control. On the interpersonal side, hone your listening skills. Join an association, such as the Quality Assurance Institute [(407) 363-1111] or the American Society for Quality Control [(414) 272-8575].

*Researched and written by Kathleen Gow, a free-lance writer based in Medford, Mass.*

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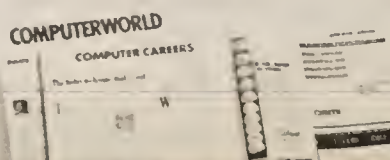
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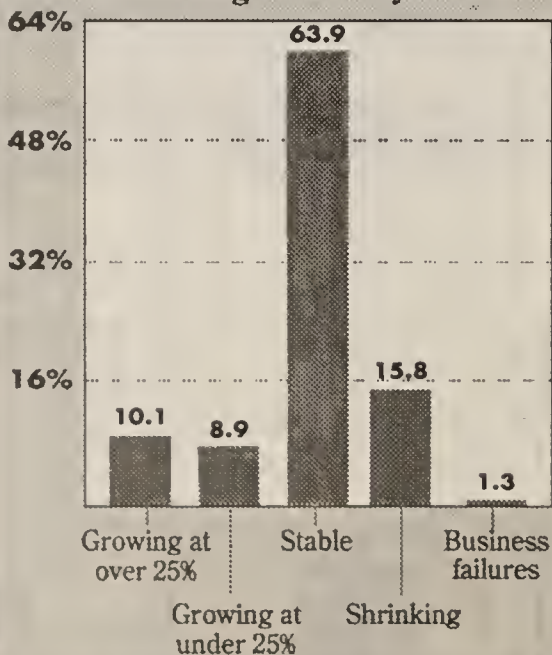
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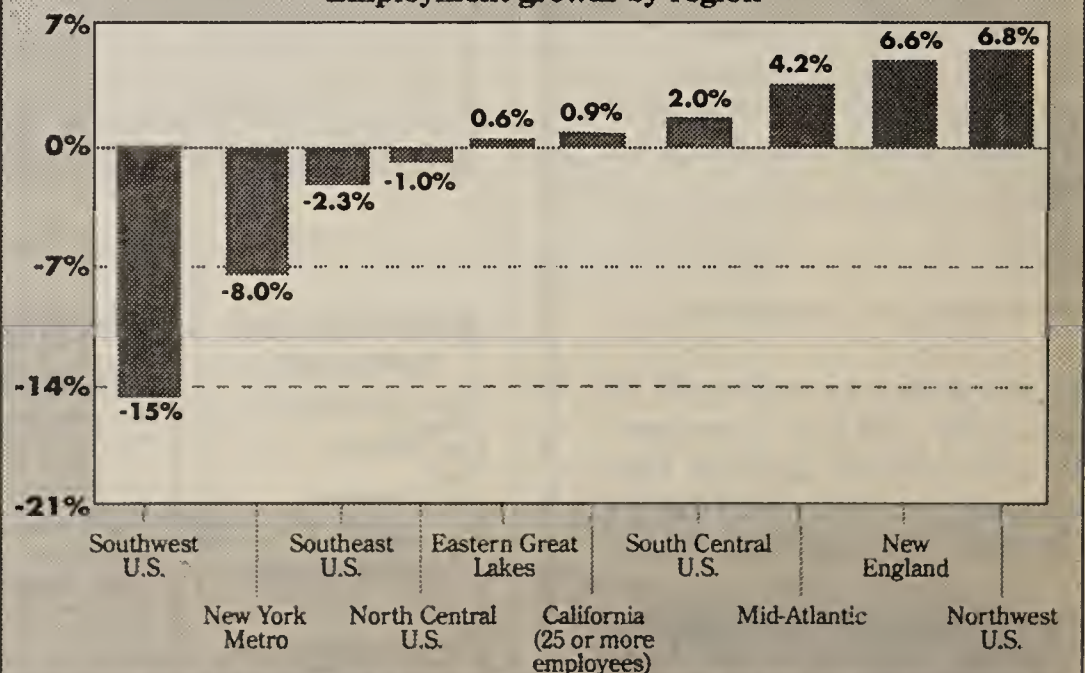
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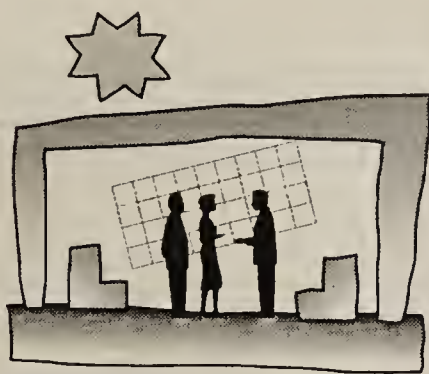
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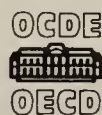
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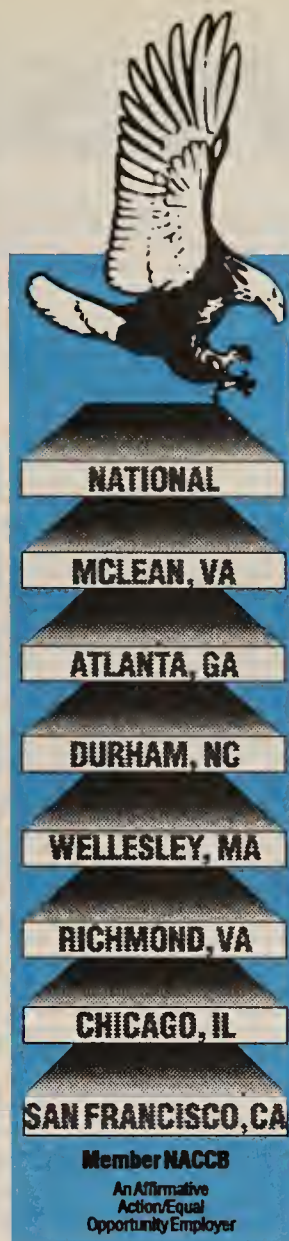
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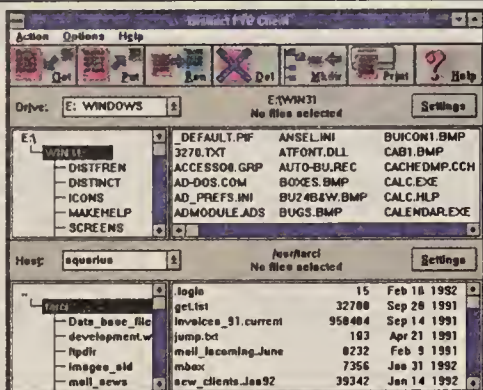
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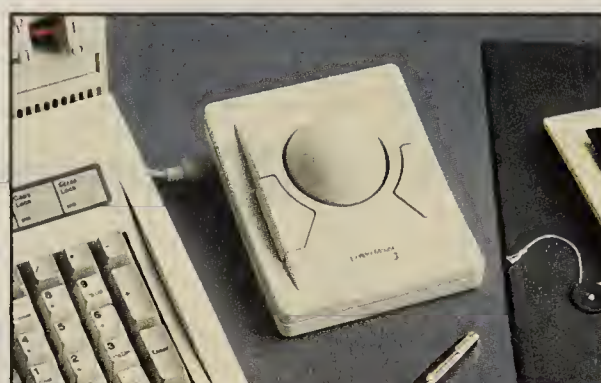


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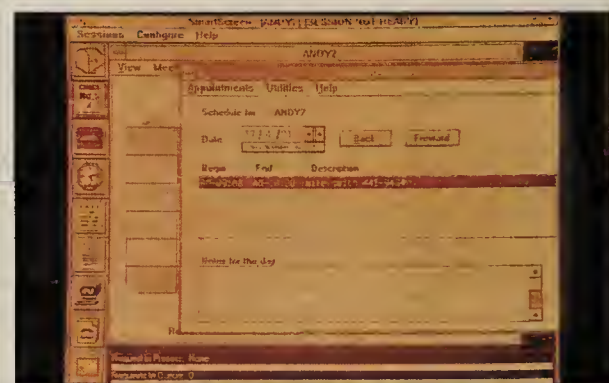
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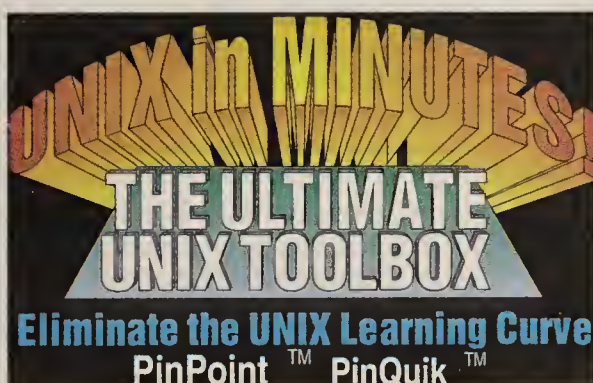
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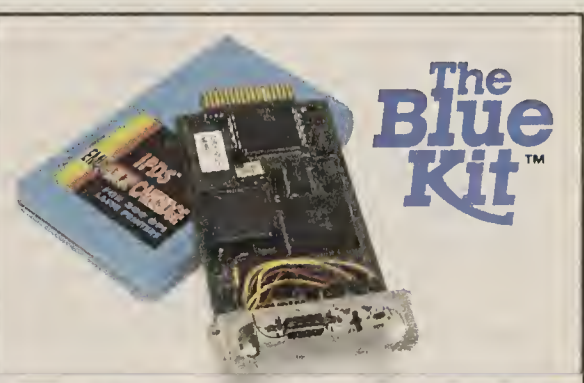
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With the touch of a key or a click of a mouse, faxes can be sent more quickly, conveniently and privately by fax boards than by conventional fax machines. Furthermore, board prices are coming down 15% to 25% a year.

In a market with more than 200 offerings, basic fax board prices start at less than \$100 for transmit-and-receive functions

and go to \$600 and higher for more buffer memory and separate on-board processors. GammaLink, Intel Corp., Supra Corp., Zoom Telephonics, Inc. and many other firms offer products in this area.

The newest board offerings — ranging from \$600 to \$5,000 — are being installed on network servers, allowing anyone on a local-area network to send and receive faxes. Server fax boards also handle multiple phone lines.

Looking much like a PC expansion board, most boards come with a built-in modem, and they drop into a slot in any IBM

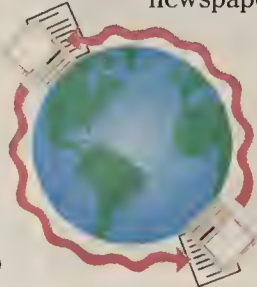
PC or compatible.

Taking only a few seconds to use, PC-generated documents are the easiest to send, whereas hard-copy documents, such as newspaper clippings, must be

scanned into the system with an image scanner, adding a minimum of \$300 to the cost.

Much of the fax board's simplicity and sophistication resides in the bundled controlling software, which can also be purchased separately.

Two of the more popular software features are prescheduling a batch of unattended transmissions at night and polling, which



is the ability to call other fax machines and download waiting documents.

Evan Sturza, publisher of the monthly newsletter "Sturza's Medical Letter," uses Intel's Satifax fax board and software to take advantage of the lower phone rates at night.

"I can slate 50 faxes to be transmitted after I leave work for the day," Sturza says.

Other software features include the ability to redial or resend corrupted files automatically; maintain a list of phone numbers; create or suppress cover pages; or broadcast documents sequentially to up to 1,000 fax machines.

Fax/modems should also be able to send and receive data at speeds of 9.6K bit/sec. or higher for the fax and 2.4K bit/sec. for the modem. These data rates enable fax/modem boards with the same data rates to exchange files.

### Trade-offs

Certain problems can negate the benefits of computer-based faxing.

Price-conscious buyers may choose the \$100 models that sometimes lack on-board processors. These boards demand more of the PC's resources during faxing and will slow it down — a critical problem for users who transmit and receive faxes in the background while running other applications.

Storage requirements can also be problematic. Fax transmissions, which are always received as graphics files, take up considerable storage space — one full page of Tag Image File Format graphics can take up as

## A CASE IN POINT

AMP, Inc., a multinational Fortune 100 electronics company, has almost completely automated the firm's parts information department with a fax-on-demand system developed by Danish International Corp. in Foster City, Calif.

Using GammaLink's fax boards and software, customers call a special telephone number and then respond to voice prompts that ask for the parts number and the customer's fax number.

The appropriate data is located in the company's database, which contains nearly 100,000 records, and the information is immediately transmitted back to the customer's fax. The system handles 1,100 faxes per day.

## Ups and downs of network fax servers

One increasingly popular use for high-end fax boards is to install them on network servers.

Using fast, on-board microprocessors and product-specific software, these boards result in a lower per-user cost and finer control over the number, purpose and timing of faxes.

Explosive growth in network fax servers — from 6,670 units in 1989 to 198,200 units in 1993 — is predicted by analysts at Norwell, Mass.-based market research firm BIS Strategic Decisions.

Users and analysts caution potential buyers to assess the situation carefully. Installing a fax board on a data or file server runs

the risk of slowing down LAN applications considerably, especially if the company is using Microsoft's Windows, says Mark Wimmers, manager of Parkway Business Machines, a value-added reseller located in White Plains, N.Y. "If you're going to fax on a network, you're going to need a dedicated machine as a server, especially for large networks," he says.

Clients on a server can share virtually any board, but the board and fax server software must be fully compatible with network hardware and software.

Atlanta-based SofNet's FileFax 2.5 fax server software costs

from \$199 to \$995 and is compatible with Novell, Inc.'s NetWare, Banyan Systems, Inc.'s Vines and a number of other networks. It is available in both DOS and Windows versions. One drawback of FileFax is that incoming faxes can't be automatically routed to their destinations, instead needing an administrator to deliver them.

Sunnyvale, Calif.-based GammaLink's \$1,295 Gammanet fax server software also runs on most major networks and will, with the aid of the \$1,395 GammaFax Model CPD board, support Direct Inward Dialing, which allows automatic routing of faxes.

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AT Model 099	\$400	\$525	\$150
AT Model 239	\$550	\$650	\$175
AT Model 339	\$600	\$700	\$250
PS/2 Model 30 286	\$650	\$900	\$300
PS/2 Model 60	\$700	\$900	\$325
PS/2 Model 80	\$2,050	\$2,100	\$1,100
PS/2 Model 90	\$4,300	\$4,600	\$3,300
Compaq Portable II	\$450	\$500	\$375
Portable 286	\$700	\$1,000	\$250
Portable 386	\$2,000	\$2,125	\$1,000
SLT 286	\$700	\$900	\$400
LTE 286	\$950	\$1,300	\$500
Deskpro 286E	\$600	\$1,000	\$325
Deskpro 386/20	\$2,000	\$2,200	\$1,100
Apple Macintosh Plus	\$700	\$750	\$475
SE	\$875	\$1,050	\$650
IIX	\$2,800	\$3,250	\$2,000
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## Computerworld Friday Stock Ticker

## STOCK TRADING INDEX



## Industry Almanac

## RECOMMENDATION CHANGES

**DOWNGRADED FROM HOLD TO AVOID: Digital Equipment Corp.** (Smith Barney, Harris Upham & Co.). Souped-up microprocessors have clearly accelerated the performance increments of computer systems. More damaging to traditional systems vendors such as DEC, however, has been the resulting shortening of product life cycles. The company is trying to address this issue with its Alpha chip. Meanwhile, DEC is getting stiff competition from IBM's midrange Application System/400.

Overall, the valley confronting DEC is wide and deep. Near-term financial prospects appear uncertain and dependent on the economy. The company just reported a \$300 million quarterly loss. Stock appreciation looks unlikely until Alpha-based systems become fully available.

**UPGRADED FROM NEUTRAL TO BUY: Network Equipment Technologies, Inc.** (Alex. Brown & Sons, Inc.). The company's share price has dropped about 30% from early February but is likely to pick up soon. New products — a multiplexer, router and switch — were made generally available late last year and should contribute heavily to sales in the current quarter. NET's balance sheet and the quality of its reported earnings demonstrate solid financial management and sound accounting.

**DOWNGRADED FROM BUY TO HOLD: Intel Corp.** (Bear, Stearns & Co.). The upside of Intel stock will be limited by concern over new products from Cyrix Corp., the attendant negative publicity from a competitive I486 announcement and the prospect of litigation. Possible reseller agreements between Cyrix and personal computer makers could result in notebooks, pen-based systems and low-end desktop machines competing with those based on Intel's 486 processor.

Intel will respond, but the controversy could limit share price acceleration in the near term. Plus, Intel's products could come later than anticipated (i.e., late 1992), while offerings from Cyrix, which is already in a legal fight with Intel over math coprocessor technology, might ship sooner than expected, possibly next month.

KIM S. NASH

## TOP PERCENT GAINERS

Gateway Communications	27.27
Emulex Corp.	22.00
Cray Computer (L)	21.88
Radius Inc.	17.39
Cognos Inc.	15.63
Everex Systems Inc.	15.45
Wordstar	15.38
Corporate Software	12.50

## TOP DOLLAR GAINERS

IBM* (L)	4.00
Matsushita Electronics	3.50
Exabyte	3.38
Autodesk Inc.	3.13
Parametric Technology	3.00
Sybase Inc.	2.75
Cabletron Systems	2.38
BMC Software Inc.	2.00

## TOP PERCENT LOSERS

Bachman Info. Systems	-37.64
FileNet Corp.	-25.76
Ross Systems	-18.63
Cypress Semiconductor Corp(L)	-17.76
Egghead Discount Software	-17.73
Adobe Systems Inc.	-16.71
CE Software	-14.55
Digital Equipment Corp.*	-13.81

## TOP DOLLAR LOSERS

FileNet Corp.	-8.50
Bachman Info. Systems	-8.38
Adobe Systems Inc.	-8.00
Digital Equipment Corp.*	-7.25
Hewlett-Packard Co.*	-5.75
Egghead Discount Software	-4.88
Intel Corp.*	-3.63
Apple Computer Inc.*	-3.50

Exch	52-Week	Range	April 10	Wk Net	Wk Pct
			Close	Change	Change

## Communications and Network Services Off 1.39%

OTC	15.00	6.75	3 COM Corp.*	11.50	-1.00	-8.00
NYS	66.00	55.75	American Info Techs Corp.*	58.75	1.75	3.07
NYS	42.13	32.88	AT&T* (H)	41.75	-0.25	-0.60
OTC	4.25	1.25	Artel Communication Corp.	1.50	-0.13	-7.69
NYS	51.00	40.38	Bell Atlantic Corp. (L)	41.25	0.00	0.00
NYS	53.00	43.38	Bellsouth Corp. (L)	44.38	0.00	0.00
NYS	9.38	4.75	Bolt, Beranek & Newman	5.75	-0.13	-2.13
NYS	65.88	30.25	Cabletron Systems	54.63	2.38	4.55
OTC	31.00	11.75	Chipcom Corp.	22.75	0.25	1.11
OTC	43.63	13.38	Cisco Systems Inc.	37.50	-2.50	-6.25
OTC	35.25	13.75	Compression Labs Inc.	21.75	-1.00	-4.40
OTC	4.63	1.50	Data Switch Corp.	2.00	-0.13	-5.88
NYS	23.63	12.38	Digital Comm. Assoc.*	19.88	0.00	0.00
OTC	19.25	8.50	Digital Systems Int'l Inc.	11.75	0.38	3.30
OTC	9.75	3.63	DSC Communications	5.50	0.50	10.00
OTC	10.88	5.00	Fibronix Int'l Inc.	6.50	0.00	0.00
OTC	37.50	13.50	FileNet Corp.	24.50	-8.50	-25.76
OTC	3.75	1.13	Gandalf Technologies Inc.	2.50	0.00	0.00
OTC	2.69	1.19	Gateway Communications	1.75	0.38	27.27
NYS	5.50	2.13	General Datacomm Inds.	4.75	-0.25	-5.00
ASE	5.88	0.50	Go Video	3.25	-0.25	-7.14
NYS	35.00	28.13	GTE Corp.*	29.75	-0.13	-0.42
NYS	70.63	50.00	ITT Corp.	64.38	-0.13	-0.19
OTC	36.13	25.25	MCI Communications Corp.	31.25	-0.75	-2.34
OTC	14.50	5.00	Microcom Inc.	11.00	-1.75	-13.73
NYS	18.25	7.00	Network Equipment Tech.*	13.88	0.63	4.72
OTC	25.50	6.75	Network General	18.00	-1.50	-7.69
OTC	20.00	10.50	Network Systems Corp.	13.50	0.50	3.85
OTC	17.88	5.50	Newbridge Networks Corp.	17.25	0.50	2.99
NYS	49.25	32.50	Northern Telecom Ltd.*	44.75	0.13	0.28
OTC	65.00	22.63	Novell Inc.*	54.13	-2.38	-4.20
NYS	82.38	68.00	Nynex Corp.*	71.50	1.38	1.96
OTC	37.50	16.50	Octel Communications Corp.	29.25	-1.00	-3.31
OTC	11.63	5.63	Penril Data Comm. Ntwks.	6.75	-0.88	-11.48
OTC	53.00	19.75	Picturetel Corp.	35.13	-3.13	-8.17
OTC	18.75	9.75	Proton Inc.	14.25	-0.25	-1.72
NYS	19.75	11.63	Scientific Atlanta Inc.	16.50	0.38	2.33
NYS	66.00	49.00	Southwestern Bell Corp.	58.75	1.00	1.73
OTC	46.25	14.25	Synoptics Communications	20.00	-0.38	-1.84
NYS	31.50	21.00	United Telecom	21.88	0.00	0.00
NYS	39.25	33.25	US West Inc.	33.25	-0.50	-1.48
OTC	41.25	21.25	Wellfleet Communications	35.63	1.38	4.01

## PC / Workstations Off 2.94%

OTC	20.50	6.50	Advanced Logic Research	6.75	0.25	3.85
OTC	3.63	1.50	Alpha Microsystems	0.00	-0.25	-10.00
OTC	70.00	40.25	Apple Computer Inc.*	55.50	-3.50	-5.93
OTC	32.25	14.50	AST Research Inc.*	16.25	-1.00	-5.80
NYS	20.00	10.13	Commadore Int'l	13.88	-0.50	-3.48
NYS	65.00	22.13	Compaq Computer Corp.*	24.88	-1.00	-3.86
OTC	27.33	13.50	Dell Computer Corp.	25.63	0.38	1.49
OTC	7.75	3.00	Everex Systems Inc.	7.00	0.94	15.45
NYS	34.00	21.25	Harris Corp.	31.38	-0.25	-0.79
NYS	85.00	44.63	Hewlett-Packard Co.*	74.25	-5.75	-7.19
OTC	20.88	7.88	Mips Computer Systems	10.63	-0.88	-7.61
NYS	29.75	13.25	Silicon Graphics	18.00	-1.25	-6.49
OTC	38.63	20.75	Sun Microsystems Inc.*	27.75	-0.50	-1.77
NYS	36.50	23.38	Tandy Corp.*	27.63	-0.38	-1.34
NYS	11.13	5.13	Zenith Electronics	8.63	-0.13	-1.43
OTC	25.50	10.75	Zeos International Ltd. (L)	12.75	-1.75	-12.07

## Large Systems Off 0.01%

ASE	20.63	11.63	Amdahl Corp.*	14.38	-1.50	-9.45
NYS	13.38	7.50	Control Data Corp.	11.75	0.25	2.17
NYS	19.75	8.88	Convex Computer	10.63	-0.25	-2.30
OTC	19.63	3.75	Cray Computer (L)	4.88	0.88	21.88
NYS	52.25	31.50	Cray Research Inc.*	38.75	-0.50	-1.27
NYS	22.50	8.00	Data General Corp. (L)	9.25	0.38	4.23
NYS	74.25	45.25	Digital Equipment Corp.*	45.25	-7.25	-13.81
NYS	110.75	81.63	IBM* (L)	86.00	4.00	4.88
NYS	130.38	93.50	Matsushita Electronics	99.50	3.50	3.65
OTC	29.50	10.75	Pyramid Technology	13.50	-1.00	-6.90
OTC	18.50	7.50	Sequent Computer Sys.	13.25	-0.50	-3.64
OTC	18.38	10.13	Sequoia Systems Inc.	15.13	1.00	7.08
NYS	54.25	27.25	Stratus Computer Inc.*	42.00	-2.00	-4.55
NYS	17.63	9.50	Tandem Computers Inc.*	12.63	0.25	2.02
OTC	4.75	1.25	Tandon Corp.	1.38	0.13	10.00
NYS	11.75	3.25	Unisys Corp.*	9.63	-0.25	-2.53
ASE	7.50	2.00	Wang Labs Inc. (b)*	4.88	-0.13	-2.50

## Software &amp; DP Services Off 2.51%

OTC	68.50	39.88	Adobe Systems Inc.	39.88	-8.00	-16.71
OTC	13.25	3.50	AI Corp.	8.38	0.25	3.08
OTC	57.75	21.50	Aldus Corp. (L)	22.38	-0.38	-1.65
OTC	19.75	10.13	American Software Inc.	15.38	-0.50	-3.15
OTC	20.00	7.25	Ask Computer Systems	14.13	-1.50	-9.60
OTC	62.25	23.25	Autodesk Inc.	34.50	3.13	9.96
OTC	37.75	13.88	Bachman Info. Systems	13.88	-8.38	-37.64
OTC	42.50	25.88	BGS Systems Inc.	34.75	0.50	1.46
OTC	79.00	33.00	BMC Software Inc.	60.00	2.00	3.45
OTC	20.00	8.75	Boole & Babbage (H)	19.50	0.25	1.30
OTC	86.75	39.50	Borland Int'l Inc.*	52.00	0.25	0.48
OTC	11.25	4.75	CE Software	5.88	-1.00	-14.55
ASE	13.75	6.50	Cheyenne Software Inc.	12.00	-0.50	-4.00
OTC	20.88	7.50	Cognos Inc.	9.25	1.25	15.63

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Exch	52-Week	Range		April 10	Wk Net	Wk Pct
				Close	Change	Change
NYS	17.00	7.25	Computer Associates*	14.13	0.38	2.73
OTC	21.50	12.00	Comshare Inc.	15.75	-0.75	-4.55
OTC	47.88	15.00	Easel Corp.	31.25	-1.00	-3.10
OTC	19.50	9.25	Goal Systems Int'l (H)	17.25	-0.38	-2.13
OTC	28.00	11.50	Group I Software	19.00	0.00	0.00
OTC	7.00	4.50	Hogan Systems Inc.	4.88	-0.25	-4.68
OTC	36.25	17.75	Information Resources	23.00	-1.00	-4.17
OTC	33.00	5.25	Informix Corp.	29.00	-1.50	-4.92
OTC	3.63	1.06	Intellicorp Inc.	1.81	0.06	3.60
OTC	31.50	16.25	Intergraph Corp.	18.00	0.25	1.41
OTC	15.00	4.88	Interleaf Inc.	9.88	-0.88	-8.14
OTC	20.25	7.38	Intersolv Inc.	15.88	-0.88	-5.22
OTC	43.25	10.50	Knowledgeware Inc.	14.13	-0.25	-1.74
OTC	45.25	20.25	Legent Corp.*	34.63	-0.63	-1.77
OTC	40.75	18.00	Lotus Development*	33.25	0.25	0.76
OTC	7.38	2.38	Meca Software	4.13	-0.50	-10.81
OTC	22.25	11.50	Mentor Graphics	14.50	-1.00	-6.45
OTC	30.25	9.75	Micrografix Inc.	26.50	-0.75	-2.75
OTC	133.25	60.50	Microsoft Corp.*	116.00	-1.50	-1.28
OTC	21.13	7.00	Oracle Corp.*	13.25	-0.75	-5.36
OTC	35.63	11.50	Parametric Technology	30.25	3.00	11.01
OTC	11.00	5.88	Phoenix Technologies	9.38	0.13	1.35
OTC	25.25	9.00	Platinum Technology	16.75	-1.75	-9.46
OTC	46.50	27.50	Progress Software Corp.	38.00	-1.00	-2.56
OTC	26.63	11.50	Quarterdeck Office Sys.	17.50	1.75	11.11
OTC	29.75	10.00	Rasterops	16.75	-0.75	-4.29
OTC	17.25	6.75	Ross Systems	10.38	-2.38	-18.63
OTC	26.25	12.50	Software Publishing Corp.	18.00	-0.75	-4.00
OTC	8.50	2.00	Software Toolworks Inc.	6.13	-0.38	-5.77
OTC	7.25	1.75	Spinnaker Software	4.00	-0.50	-11.11
OTC	16.50	6.25	State of the Art	13.75	0.00	0.00
NYS	25.25	10.88	Sterling Software Inc.	20.38	-1.00	-4.68
OTC	30.00	14.25	Struct. Dynamics Research	15.75	-2.50	-13.70
OTC	31.75	15.00	Sybase Inc.	27.75	2.75	11.00
OTC	51.00	19.50	Symantec Corp.	43.00	1.75	4.24
NYS	15.50	6.88	Systems Center Inc.*	12.75	0.38	3.03
OTC	31.00	8.34	System Software Assoc.	28.25	-0.88	-3.00
OTC	6.63	2.75	Wordstar	3.75	0.50	15.38

## Semiconductors Off 2.76%

NYS	21.50	8.38	Advanced Micro Devices	16.63	-1.13	-6.34
NYS	12.50	7.00	Analog Devices Inc.	10.00	0.25	2.56
OTC	18.88	6.75	Atmel Corp.	8.75	-0.38	-4.11
OTC	14.13	7.00	Chips and Technologies	8.88	-0.38	-4.05
NYS	24.50	11.00	Cypress Semiconductor Corp(L)	11.00	-2.38	-17.76
NYS	12.00	6.25	Dallas Semiconductor	8.75	-0.50	-5.41
OTC	68.75	38.50	Intel Corp.*	51.13	-3.63	-6.62
NYS	12.50	6.50	LSI Logic Corp.	7.25	0.00	0.00
NYS	22.38	10.88	Micron Technology	14.88	0.25	1.71
NYS	82.50	54.00	Motorola Inc.*	74.13	0.75	1.02
NYS	11.50	3.88	National Semiconductor*	9.00	-0.38	-4.00
OTC	27.00	13.00	Sierra Semiconductor	16.50	0.50	3.13
NYS	47.63	26.00	Texas Instruments*	32.25	-0.25	-0.77
OTC	12.25	5.88	VLSI Technology	8.75	0.00	0.00
OTC	15.75	3.75	Weitek	4.75	0.13	2.70
ASE	6.25	2.00	Western Digital Corp.	3.63	-0.13	-3.33
OTC	32.50	19.25	Xilinx	24.13	-1.38	-5.39
OTC	11.50	4.25	Zilog Inc.	8.00	-0.25	-3.03



## IN BRIEF

### Court nays EMC plea

■ The U.S. District Court in Boston last week rejected **EMC Corp.**'s motion to dismiss a 14-month-old suit that charged the Hopkinton, Mass.-based memory systems maker with misappropriation of **IBM Credit Corp.** assets. The court upheld IBM Credit's contention that its lease contract does not allow IBM parts to be substituted by those of another vendor. Last December, a Delaware court rejected a motion filed by Comdisco, Inc. to dismiss a similar suit brought by IBM.

■ **IBM** also received good news from the financial market last week. **Standard & Poor's Corp.** reaffirmed IBM's triple-A ratings on about \$19 billion worth of debt. S&P's move comes one month after Moody's Investors Service, Inc. downgraded IBM's debt rating to double-A2.

■ **Advanced Micro Devices, Inc. (AMD)**, buoyed by growth of its Intel Corp. 80386-compatible chip, last week reported first-quarter sales of \$407.4 million, up 48% from the same period last year. Net income was \$84 million for the period ending March 29, up 95% from last year's first quarter. Sales of AMD's 386-like chip grew over 20% during the previous quarter to \$180 million.

■ **Bachman Information Systems, Inc.** in Burlington, Mass., warned Wall Street last week to revise earnings and revenue projections for the firm's third quarter, ended March 31. Bachman said softness in North American sales and extended selling cycles for its new products have caused the firm to fall short of earlier expectations. Separately, the company said, Gary Krueger, vice president of North American operations, resigned last week.

## DEC calls for help with PC push

BY SALLY CUSACK  
CW STAFF

BERKELEY, Calif. — Digital Equipment Corp.'s decision earlier this month to acquire a mail-order software house could boost the Maynard, Mass.-based company's fledgling direct-mail personal computer business, analysts said last week.

800 Software, Inc., a \$77 million privately held firm, will provide PC software, peripherals and networking services to DEC's Fortune 100 customers [CW, April 6].

Stephen Widen, senior analyst at Workgroup Technologies, Inc. in Hampton, N.H., said DEC has realized some early success with its new Desktop Direct catalog and mail-order PC campaign.

However, because PCs are historically not mainstream business for DEC, Widen said, 800 Software would bolster DEC's early posturing in this market. The move, he said, gives DEC one more iron in the price competitive mail-order fire.

Ten-year-old 800 Software

buys products directly from suppliers such as Lotus Development Corp., Novell, Inc. and Microsoft Corp., and it currently carries 12,000 different items in

fulfillment in the PC product arena for select DEC customers.

Brown said 800 Software will bring several advantages to DEC's PC efforts, including pre-sales and technical support, product comparisons and a comprehensive upgrade service.

"We are a multivendor supplier of software products, and we only carry those programs we have carefully scrutinized," Brown said.

While the financial terms of the agreement have not been disclosed, 800 Software will be an independently managed and wholly owned subsidiary of DEC.

The acquisition is expected to close within 30 to 60 days, DEC said. A DEC spokesman added that all 200 of the company's employees would remain on the payroll.

Stephen K. Kirchoff, U.S. new venture business manager at DEC, said 800 Software was selected based on the company's record of rapid growth, customer service and customer support. 800 Software's \$77 million in 1991 sales represented a growth of 48% from 1990.

### At a glance

#### 800 Software, Inc.

- **1991 sales:** \$77 million.
- **Revenue mix:** 85% of sales come from PC software applications; the remainder are derived from network and peripheral products.
- **Key customers:** Include Bechtel, Grumman Aerospace and Weyerhaeuser.
- **Employees:** 200.
- **Offices:** Berkeley, Calif. (headquarters); Chicago; Dallas; Los Angeles; Natick, Mass.; Washington, D.C.

CW Chart: Michael Siggins

its warehouse, located here. It also provides training services and in-house technical publications for customers.

DEC approached 800 Software late last fall, according to Steven D. Brown, 800 Software's president and co-founder. The company has operated for the past two years as a third-party software supplier for DEC's internal corporate needs. It has also supplied and handled order

## User study: Quality efforts show up on the bottom line

BY NELL MARGOLIS  
CW STAFF

BOSTON — In the wake of the prestigious Malcolm Baldrige National Quality Award, corporate quality initiatives in the computer industry have zoomed past "chic" to "politically correct."

But quality is not a fad: It is an indispensable competitive weapon, according to market research firm Dataquest/Ledgeway. Service providers who slough off the quest for quality as nothing more than hype do so at their peril, said several speakers at the firm's ninth annual service trends conference last week.

According to a Dataquest/Ledgeway 1991 study of user wants and needs in the support services arena, "quality of ser-

vice delivered" is the No. 1 factor that users employ in selecting and switching service providers. Scope of services offered, price and vendor reputation followed in a dead heat for second place — all well behind quality.

"Mr. Gucci got it right: Quality is remembered long after price is forgotten," Dataquest/Ledgeway Vice President Ellen Kitzi said.

"I view [customer satisfaction] as a one-strike business,"

said David Lustig, manager of corporate technical services at audio equipment manufacturer Bose Corp. in Framingham, Mass.

In addition, Kitzi said, a service provider's reputation has surprising staying power — for better or worse.

"Even a weak product offering can be offset by a strong qual-

ity image," Kitzi said. But if your firm gets tagged with a weak quality image, "you can produce quite a good product and find that customers are still staying away in droves."

### Learning stage

Kitzi said the computer industry is at the stage where it can learn from early mistakes rather than be frightened off by them.

"Most quality programs that fail do so for one or more avoidable reasons," she noted, offering a list of guidelines:

- Tie changes to clear performance objectives.
- Implement in increments — efforts that are too large-scale and diffused are likely to fail.
- Measure success in terms of results rather than performance; performance-oriented goals are prone to inspire committee meetings and position papers rather than altered behavior.
- Do not leave consultants or other outsiders in the driver's seat; true quality is inspired from the top down and implemented from within your organization.
- Tie your goals to empirically learned customer needs and requirements.

## Novell loses two execs

BY JIM NASH  
CW STAFF

The recent departure of two high-level Novell, Inc. executives is expected to have minimal impact on the networking software giant, analysts said last week.

Jim Bills, head of the NetWare Systems Group, and Dick Williams, leader of Novell's Desktop Systems Group, abruptly resigned the week before last. Novell issued a statement last week, saying the timing of the resignations was a coincidence.

Bills, 39, was seen by many observers as the apparent heir to Novell's President and Chief Executive Officer Ray Noorda. Personal reasons were cited for Bills' May 1 departure.

Williams had been president of Digital Research, Inc. until it was bought by Novell with 3 million shares of company stock last October. No reason was given for his leaving. Williams will stay with Novell until the end of the month, smoothing the ongoing integration of Digital Research and Novell.

A source at Novell who requested anonymity said Bills recently had grown tired of the stressful nature of his job, and, as one of Novell's major shareholders, decided to leave the company. Bills had been an executive officer at Novell for six years.

### No waves made

Cecilia Brancato, an analyst at Oppenheimer & Co. in New York, predicted that the resignations would have little negative impact on the company or its stock. "Over the last 18 to 24 months, Novell's management team has executed flawlessly. They have a very deep management team, with many players beyond the well-known people," she said.

"That's the reason you can have one or two key people leave without the company tumbling to the ground," Brancato added.

In the aftermath of the resignations, Jan Newman, vice president of software development, and John Edwards, vice president of marketing for the NetWare Systems Group, were promoted.

Newman now serves as executive vice president and general manager of the NetWare Systems Group. Edwards has been bumped up to vice president and general manager of the Desktop Systems Group.



# WYSIWYG



## Recession-proof jobs

Based on a report by  
Career Research Associates

### Computer systems analyst

Earnings potential (1991):  
**\$35,000 - \$52,000**

Job growth (1991-2000):  
**79%**

New positions (by 2000):  
**366,000**

### Computer and office machine service staff

Earnings potential (1991):  
**\$25,000 - \$40,000**

Job growth (1991-2000):  
**60%**

New positions (by 2000):  
**50,000**

### Computer programmers

Earnings potential (1991):  
**\$16,000 - \$50,000**

Job growth (1991-2000):  
**56%**

New positions (by 2000):  
**317,000**

► Do you have anecdotes about your users, your boss or your job? Know any industry trivia? If so, please contact Lary Zattala or Jadie Naze at (800) 343-6474. If we use your ideas, we'll send you a gift.



## FLYING THE UNFRIENDLY SKIES

Ohio State University researchers found in a study that on-board computers often confused, rather than helped, pilots. Two-thirds of 135 pilots responding said they have been surprised by system functions. They said there are too many options from which to choose to accomplish a given task, and that the systems are often user-unfriendly. Also, because each pilot may program the system differently, it becomes difficult for the next person to operate the system without adjustment.

## THE COMPUTER PERSON'S PRAYER

OUR PROGRAM, WHO ART IN MEMORY,  
HELLO BY THY NAME.  
THY OPERATING SYSTEM COME,  
THY COMMANDS BE DONE,  
AT THE PRINTER AS THEY ARE ON THE SCREEN.  
GIVE US THIS DAY OUR DAILY DATA,  
AND FORGIVE US OUR I/O ERRORS  
AS WE FORGIVE THOSE WHOSE LOGIC CIRCUITS ARE FAULTY.  
LEAD US NOT INTO FRUSTRATION,  
AND DELIVER US FROM POWER SURGES.  
FOR THINE IS THE ALGORITHM, THE APPLICATION AND THE SOLUTION,  
LOOPING FOREVER AND EVER. RETURN.

Sources:  
*Technobabble*  
by John A. Barry  
(MIT Press,  
1991); April  
1992 *Technol-  
ogy Review*;  
Career  
Research  
Associates,  
Pittsford, N.Y.;  
WYSIWYG  
design and  
illustration:  
Tom Monahan



Photo: Russell Illig

## But are they worth more than Ken Griffey Jr.'s rookie card?

The Oregon Graduate Institute of Science & Technology in Beaverton is offering trading cards depicting the educational background, research interests, grants, publications and hobbies of five of its scientists.



If you only kept your '70s leisure suit Ordinary shoes shuffling across the carpet can generate over 1,000 volts of static electricity — bad news for sensitive computer equipment. But with special vinyl-soled Statis shoes from Plastic Systems, Inc. in Marlboro, Mass., you'll generate less than 35 volts.

## INSIDE LINES

### Available, but you can't buy it

► Network Equipment Technologies' (NET) high-end IDNX/90 T3 multiplexer has reportedly been called back into controlled release because of reliability problems. A large investment banking firm that buys its NET gear through NET business partner IBM said a glitch in the switch's bus is causing performance, power supply and diagnostics problems. NET said the product is in controlled release to ensure that recent enhancements for easing installation and upgradability are properly handled. IBM said it will resume shipments by year's end, at which time it hopes to have expertise to support the product.

### Go-go times

► IBM will complement the release of Go's PenPoint pen-based operating system this Thursday with an introduction of its own: a PenPoint-based tablet PC that was first shown at Comdex/Fall '91. The 5½-pound machine uses Intel's 20-MHz 80386SL microprocessor and features a 20M-byte solid-state storage drive. It may ship by year's end, sources said.

### Future notes

► Terry Rogers, vice president of the Communications Products Division at Lotus, used Comdex/Spring '92 to shed a little more light on future Notes plans.

Notes' first two Unix ports will be to IBM's AIX and Sun's Solaris 2.0 environments, he said. The first Apple implementation will be as a Macintosh client linked to an OS/2-based Notes server, Rogers added.

### Sneak previews

► For once at Comdex, the real action came off the show floor, where scores of products scheduled to pop up at PC Expo in New York in June could be seen. Sources said TI, which missed its intended Comdex release of an I486-based portable, managed to show some "blow-you-away" products. They'll be ready for June and are slated to have a \$3,000 price tag — \$1,000 less than similar products from Compaq. Cyrix had a full 32-bit, DX-compatible version of its new 486SLC running programs and also displayed Intel SX and Advanced Micro Devices SXL notebooks from AST Research running with its 486SLC in place.

### The light at the end of the tunnel?

► Oracle, which for several years has been predicting the imminent release of Oracle Version 7.0, may finally be close to the prophecy. The company has been meeting with key clients, developers and sales partners. And last week, 13 beta-test users who have had 7.0 code since August spent the day with top Oracle execs.

### Digital dilemma

► Mere hours before Daily 3, California's newest lottery game, was to go on-line, someone noticed a lit-

tle flaw in the programming: It wasn't producing random combinations of three digits. Those drooling at the thought of winning \$500 — one chance in 1,000 — will have to wait to plunk down their dollar. No restart date has been announced.

### All you had to do was ask

► At Comdex, Everex Systems showed the unannounced Carrier SX/25 laptop, featuring Advanced Micro Devices' 25-MHz AM386SXL chip, a removable hard drive, a touch-panel type of mouse and two 2½-hour battery packs. A PC Expo rollout is planned. The MPS 1000 will take over as the company's new high-end scalable multiprocessor Unix system. Due to ship in about nine months, it can expand up to a total of 10 Intel 486 CPUs. Bus transfer speed will be 133M byte/sec., and the box will have a 256M-byte error-correcting code memory.

*The press room at Windows World was curiously devoid of IBM's logo, despite the fact that IBM, in conjunction with WordPerfect, supplied both hardware and software for reporters to use at the show. The hardware was apparently not the problem — it was the software. According to a WordPerfect representative, Microsoft refused to let IBM display its name on promotional "equipment supplied by" banners because of IBM's windows platform, OS/2 2.0. Got anything to spill? Phone, fax or Compuserve News Editor Alan Alper at (800) 343-6474; (508) 875-8931 or 76537,2413, respectively.*





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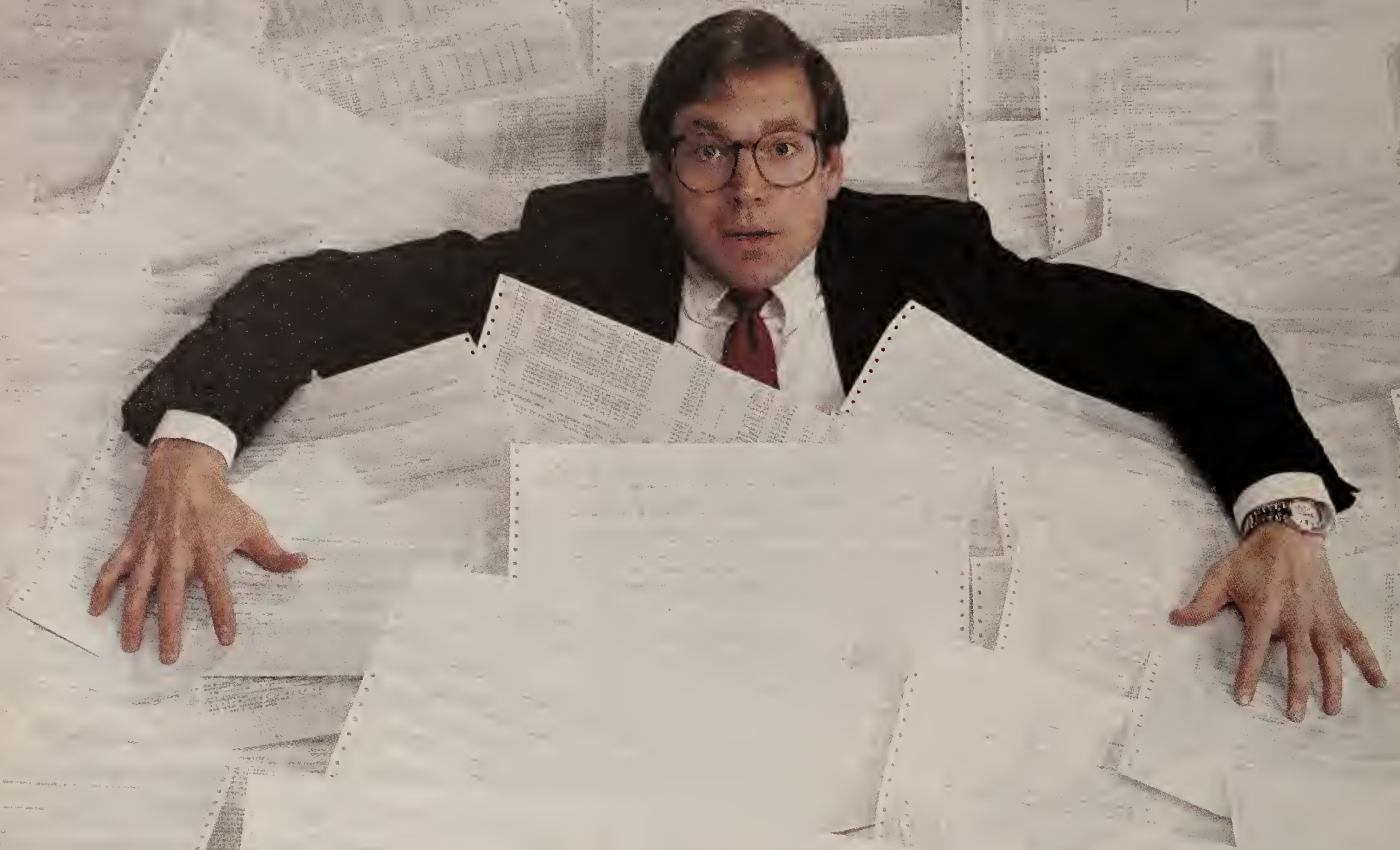
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